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THE OUTLOOK FOR RESEARCH¹

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Suppose that you were asked to characterize the American people by means of a few broad generalizations. What would you say? It would depend upon your age and experience. If you were young and quick witted a few brilliant dashes of color would suffice to complete the picture; if older and more wary you would hesitate to take the brush in hand at all. You would perhaps recall the confession of our best informed critic, Mr. Bryce: "When I first visited America, in 1870, I brought home a swarm of bold generalizations. Half of them were thrown overboard after a second visit, in 1881. Of the half that remained, some were dropped into the Atlantic when I returned across it after a third visit in 1883; and although the two later journeys gave birth to some new views, these views were fewer and more discretely cautious than their departed sisters of 1870." If, however, without committing yourself to any opinion you merely attempted to recall what others had most frequently said on such occasions, "The Land of Dollars" or some such phrase could scarcely fail to present itself immediately. In spite of this you should not be too ready to plead guilty to the charge of unusual devotion to material interests. It is true, of course, here as elsewhere, that the world is too much with us and that we exhaust our energy unduly with mere getting and spending. But it is not enough to note the eagerness with which a man acquires his wealth, you must observe the way in which he spends it for an indication of the spirit that really moves

¹Address at Clark University on Founder's Day, Feb. 1, 1911.

him. Now if you do this with America you will see that its moving spirit is not to be spoken of disrespectfully in comparison with that of other countries. Here, as elsewhere, wealth is put to base uses, but it is also put to many that are noble and perhaps there is no more striking evidence of this than in the splendid endowment for education and research that marks off this country from all others in the world. The case of Jonas Clark is only one of many who have striven hard to give others advantages that were denied to them. His foundation of this great University has certainly added lustre to this city and carried the name and fame of Worcester far into regions of the world where otherwise it might never have been heard of. It is well for all of us to do honor to such a man, although on you rests a peculiar obligation to remember him and to show by the earnestness of your pursuit of learning how sincerely you appreciate his splendid provision for advanced study and research. Colleges and universities for the acquisition of knowledge had existed in this country for generations and, at least in some of them, much had been done by scholarly men for the advancement of learning. It remained for Clark to follow in the footsteps of its spiritual parent, Johns Hopkins, and devote itself exclusively to post-graduate work. Conditions have somewhat changed in both these universities, but I hope that the spirit of research will always remain a prominent feature of them both. The world needs a manifestation of this spirit to-day, and America certainly not less than other parts.

It is on the outlook for research in this country that I wish to direct your attention. You must know that in spite of the splendid provision for research that is so marked a feature of this country, there is much misgiving as to the future. Indeed no one can fail to be impressed with the striking contrast that is presented between the prevailing pessimism with regard to culture and the prevailing optimism with regard to material advancement. If we put aside the jibes of those who speak as if success in anything obtained by honorable means could be a proper subject for a sneer, we find little serious criticism of our business methods (apart from the moral issues that they raise). When our visitors have gotten over their first surprise at the height of our buildings and the size of the headlines in our newspapers, then, if the music of praise be in them at all they point to our wonderful material successes and sing pæans over our time-saving devices and other evidences of our skill in "practical" affairs. Soon, however, they begin to shake their heads (and too often we shake ours in stupid unison) over the outlook on the side of culture. They say that we cannot create literature, or advance science, or paint pictures.

My own view is that all this is nonsense. I agree neither with the pessimists nor with the optimists. Not with the optimists, for it is not merely with admiration that I am moved when I examine our methods of business. It is true that we have had exceptional success, but that is largely because our opportunities have been exceptional. What we do we do on a great scale, but we often do it very badly and with little regard for real efficiency. Many of our industrial operations are conducted wastefully and in ignorance of the real facts. There is room for vast improvement in almost every branch of our industry by the adoption of more scientific methods. Nor am I on the side of the pessimists. I do not merely *think* that we can produce first rate men of science, I *know* that we do produce them. The deplorable fact is that as a rule we have not the grace to recognize them. Let me cite a few examples, out of many that might be adduced, from the field of my own special interests. Take first the case of J. Willard Gibbs, of Yale. Of him Sir Joseph Larmor addressing the Royal Society of London, and doubtless weighing his words before such an audience, said: "The nineteenth century will be remembered as much for the establishment of the dynamical theory of heat at the very foundation of general physics, as for the unravelment of the nature of radiation and of electricity, or the advance of molecular science. In the first of these subjects the name of Carnot has a place by itself; in the completion of its earlier physical stage the names of Joule and Clausius and Kelvin stand out by common consent; it is not too much to say that, by the final adaptation of its ideas to all reversible natural operations, the name of Gibbs takes a place alongside theirs." Gibbs's chief achievement was the development of the fundamental principles that regulate the trend of transformation in chemical and physical processes. In science to know is to predict, and when you can predict changes in physical state you must be near the root of the matter. And so all competent authorities recognize that Gibbs rendered the greatest service to chemistry by definitely marking out the channels within which a scheme of reactions can proceed. In spite of this he was hardly known in this country at the time when he was making these great advances. He was discovered by a foreigner, Maxwell, who in 1876 contributed an enthusiastic exposition of Gibbs's work to the Cambridge Philosophical Society in England. This introduced Gibbs to Europe and particularly to the great physical chemists of the Dutch school who quickly recognized the importance of Gibbs's work and developed it experimentally. After this, of course, Gibbs was honored by scientific societies

at home as well as abroad, but even now few outside a very limited scientific circle have ever even heard of him.

Think next of G. W. Hill, a graduate of Rutgers College, one of the most original characters in the history of American science. He is happily still with us, living apart from the rushing tide that surges in the neighborhood of New York, on his peaceful farm in the valley of the Hudson. What proportion of the graduates of American colleges know anything of Hill, although the most famous of French mathematical physicists, Poincaré, says: "His theory of the moon will make his name immortal. In that work he proves himself not only a skilled artist and persistent investigator, but a profound and original inventor."

These two men belonged to an earlier generation and you may think that things have changed of late. Let me take, then, a thoroughly modern instance—a man too young to be classed with Gibbs and Hill, but one who has given promise that he may yet attain that honor. George E. Hale graduated from the M. I. T. in 1890. The thesis for his degree was entitled "Photography of the Solar Prominences," and in his hands it quickly led to developments which in the opinion of the highest authorities abroad mark the beginning of a new era in astronomy. He has taught us a selective method of photography by means of which we can obtain a picture of the clouds of hydrogen in the sun, another of the clouds of calcium vapor, and so of other elements. From this he has gone on from strength to strength and since the resources of the Mt. Wilson observatory, supported by the Carnegie Institution, have been at his disposal, he has unravelled many of the mysteries of the sun spots, and enabled us not only to detect but to measure the magnetic forces that play around the sun. For such work he has been crowned with honor abroad and warmly acclaimed by a small band of scientists at home. Outside this band, however, his name is scarcely known, even where one might expect otherwise. A few days ago Mr. Carnegie announced that he had added ten million dollars to his endowment of research. In making this gift Mr. Carnegie remarked that all that he had done for the encouragement of research had been fully justified by the work of one genius—Professor Hale, the director of the Mt. Wilson Observatory, and added "All the world will listen to the wizard on the top of Mt. Wilson." Such praise coming from such a source naturally attracted attention. All the newspapers had much to say of Mr. Carnegie and some of them referred to Mr. Hale. The latter's name, however, was evidently new to most of them and in Boston itself I saw no immediate recognition of the fact that this "wizard" was trained at one

of the great educational institutions of that city and did epoch making work there twenty years ago. Had he been an equally distinguished foreigner the very details of his domestic life would have been displayed for our edification.

Why this comparative neglect of our fellows? It is certainly not due to any lack of generosity or any unwillingness to recognize genius in our midst. Mr Bryce says that we have "enthusiasm for anything that can be called genius, and an over readiness to discover it." And yet, as I have indicated, we often fail to make the discovery. It seems as if we lacked the sense of value, and, with the best intentions in the world, too often heaped honors on the wrong man. It would be interesting to follow this matter up and discuss its causes. That, however, would lead me astray, for the main purpose of the citations that I have given you has been to prove that as a matter of fact we do produce front-rank men of science. Whether, having regard to the general level of intelligence and to the special educational opportunities that are presented, we produce as many great names as should be expected is another question. It is, however, idle to discuss it; for the only practical question is—can anything be done to improve our condition, whether it be good or bad? Are there any special forces at work making against really first-rate work, and if so, can these forces be counteracted? Could Darwin have been produced in an American University to-day? is a question that has led to an interesting discussion recently. Put in this form the question is easily answered. Such men are not *produced* in any University. They are God's favorite children; and of the education of His favorites He is in no wise particular. Like the poets, they are born not made, or as Osborn puts it, "The first secret of greatness is to be born great"—unfortunately a difficult task. No one, as far as I know, even professes to be so much in the secrets of Providence, or to have penetrated so far into the mysteries of heredity, as to suggest that there is smaller chance of being born great in America than elsewhere. Yet one may be born for great things and fail to perform them through adverse circumstances. Could Darwin have done his work at an American University? Osborn seems to doubt it, and there can be little question that there are many forces at work here that are adverse to the scholarly life.

The influence in this direction that is most commonly discussed is our devotion to material success. Men are probably just as keen to grow rich in other lands, but their chances of success are smaller. Here almost every man of brains is made to feel that there is nothing but self that can permanently exclude him from the circle of the rich. The bait is placed

before so many that it is not surprising that many swallow it. It is a bait, too, that attracts men of large vision, for the scale of business is unusually great and many of its larger problems are of a character to appeal to the imaginative mind. And so it comes about quite naturally that an unusually large percentage of the best brains go into the business of America. Then it must be admitted that the rewards of the scholar are smaller here than in older lands. This may not be true of the scholar who becomes famous, but it is true of the larger body that are never heard of. There is not the same respect here as elsewhere for the scholar as such, whether he be successful or not. After all, fame is the last infirmity of noble minds and it does not help a man very much in his dark days to know that he will be appreciated *if* he become famous. He is not made to feel that he is on the right track whether he win success or not and that his mere efforts to succeed in the scholarly calling will win him respect. And so he often loses heart before success crowns his labors.

A strong force making against first-rate work is the lack of repose that characterizes our people. If we are not always in a hurry we are nearly always restless. This restlessness shows itself clearly in the field of science. Our young men do not stick long enough to a special line of research, but are too ready to plunge into new fields, into any region indeed that happens to be prominent at the moment. Perhaps it is true that too many of our universities are in, or near, great cities, which present too many distractions—social and political. Of course great work has been done in London, Paris, and Berlin, but almost invariably by men strong enough to keep out of the rush. Even apart from the throbbing life of a great city, there are usually more than enough distractions within a modern university itself. We hear complaints on all hands in this country of the multiplication of machinery, the endless reports that are called for, the crushing load of committee meetings that must be borne. Perhaps our scholars to-day are too ready to assume such burdens, or devote themselves with needless seriousness to such interests. Here and elsewhere men have done great things while burdened with the routine duties of administrative office. Adams, who discovered Neptune, was the bursar of a Cambridge College, and many similar examples might be cited from the leading men of to-day. The strong and determined override all obstacles.

A serious source of danger in this country lurks in an otherwise excellent thing, our peculiar devotion to *institutions*. Practically in all cases the institution overshadows the man. That this should be the case with the mass of students is not

at all surprising; but it is surprising with the few who make it their life-work to master a certain subject. It is almost incredible that these should fail at any time to recognize the importance of coming in close personal contact with the master in their chosen field. In the realm of physics an Englishman who has selected his life work does not go to Cambridge, but to J. J. Thomson or to Larmor, just as a Scotsman did not go to Glasgow but to Kelvin, nor a German to Berlin but to Helmholtz. Our men are learning this lesson slowly, but they still go far too much to Harvard or to Yale or to Columbia.

I fear that we must admit that the character of our teaching is one of the forces making for the triumph of mediocrity. The fact is that we teach too much, that we spoon-feed our students and do not throw the better ones nearly enough upon their own resources. A peculiar merit of the Oxford and Cambridge system is the badness of the teaching. The students are brought face to face with really eminent men; these guide them more or less haphazardly into the mine and let them learn as best they may to recognize real gold when they see it. The system, or lack of system, may be hard on the average student but it has its merits for the bright ones. Here, unfortunately, we run some danger of sacrificing everything to the average.

It is sometimes said that we have too many facilities for research. "Every usable drug," says Jordan, "and every usable instrument is on tap. A button brings the investigator all the books of all the ages, all the records of past experience, carrying knowledge far ahead of his present requirements." Of course this is not meant to be taken literally, such facilities being all for good in the saving of valuable time. The danger lies in attaching undue importance to the mere equipment for research, and in paying more attention to the machinery than to the man that makes use of it. Some say that we encourage research too much, and stimulate it artificially. Talk of this kind is, for the most part, nonsense. There is certainly much that goes by the name of research that might well be dispensed with. The Atlantic Monthly has satirized researches to discover "the prefixes in P to be found in Plautus, the terminations in T of Terence and so forth." Such work ought never to be dignified by the name of research, its only use being to keep men out of mischief. Some, who have more serious efforts in mind, complain that much of our research is mediocre in quality and that from the tons of theses that our young graduates produce nothing of any real value ever comes. This is doubtless an exaggeration, but we miss the whole point of all "research" of this class if we fail to see that the effort to be productive is an all

important part of real education. As Osborn has recently reminded us, "One cannot too often quote the rugged insistence of Carlyle: 'Produce! Produce! Were it but the pitifullest infinitesimal fraction of a product, produce it in God's name.' 'Tis the utmost thou hast in thee; out with it, then!" In this field it is certainly "better to have loved and lost, than never to have loved at all." You may easily get a better grasp of what learning really means, you may get far more insight into real culture, if you honestly try to advance the bounds of knowledge and fail, than if you spend your days in reading of the efforts of those who have been conspicuously successful as pioneers of learning. It is the failure to recognize that it is the giving out rather than the taking in that more than all else makes an educated man or woman that lies at the base of most that is really disquieting in the popular criticisms of education.

After all, however, most of these drawbacks that have been mentioned—materialism, lack of repose, bad teaching and the like—are external and can be overcome. If we fail the fault is not in our stars but in ourselves. Too often, while professing to be scholars, we do not take the scholarly calling with sufficient zeal. A religious friend to whom I had commended the life of Wesley for its literary merits, remarked after reading the book "*The religious men of to-day are not like Wesley and they do not want to be like him.*" If we are not like the great scholars of other lands and other days, do we really want to be like them? Is scholarship with us a consuming passion, and does all else seem comparatively trifling? I often doubt it. Last year I met in Europe a group of young physicists. They talked of little else than recent theories of the ether and recent speculations as to the nature of electricity and of matter. Everything else seemed to them trivial. Returning to this country, I met a similar group, or rather a group professing similar interests. They too were ready to discuss such matters *if they were encouraged to do so*; but other thoughts were evidently more in their minds. They had a dozen interests quite as strong as that in physics. Science must be pursued with the same devotion as must art—fundamentally the spirit of both is the same. The scientist like the artist must be ready to do anything and to go anywhere to get in touch with masters in his chosen field. He must deem no sacrifice of time or energy too great to secure a real mastery of the *technique* of his profession. In the field of physics, for example, he may have to spend years in preliminary training over mathematics—as did Maxwell, Stokes, Kelvin, Rayleigh, J. J. Thomson and the like. And if he does this at all, he must do it thoroughly so that he may use

his mathematics with ease and grace and not in the blundering cumbrous fashion of the amateur.

Well, we must recognize our shortcomings, but after all the outlook for research is distinctly encouraging. Of the older men it would be an impertinence to say anything, save to remind you that the conquests they have already achieved have won them honor throughout the world. There is much, too, that is promising amongst the young men—they are keen, energetic and full of hope. And they have ground for hopefulness, for they live in stirring times. "The new discoveries," said J. J. Thomson recently, "made in physics during the last few years, and the ideas and potentialities suggested by them, have had an effect upon workers in that field akin to that produced by the Renaissance. Enthusiasm has been quickened, and there is a hopeful, youthful, perhaps exuberant, spirit abroad which leads men to make with confidence experiments that would have been thought fantastic twenty years ago. It has quite dispelled the pessimistic feeling not uncommon at that time, that all the interesting things had been discovered, and all that was left was to alter a decimal or two in some physical constant. There never was any justification for this feeling, there never were any signs of an approach to finality in science. As we conquer peak after peak, we see regions in front of us full of interest and beauty, but we do not see our goal, we do not see the horizon, in the distance tower still higher peaks, which will yield to those who ascend them still wider prospects." I have spoken mainly of physics, because it is there that my special interests lie, but I do not mean to suggest for a moment that that region has a monopoly of the alluring peaks of human knowledge. There are doubtless equally fascinating ranges for exploration in other lands where the spirit of hope is also abroad. Most heartily are our young explorers to be congratulated at the prospects that lie before them. May they brace themselves for the task with the determination and hopefulness that characterize their country and may not a few experience the thrill of scaling peaks that no man in all the ages has yet conquered.

A STUDY OF VOLUNTARY ASSOCIATIONS, EDUCATIONAL AND SOCIAL, IN EUROPE DURING THE PERIOD FROM 1100-1700

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Charles H. Cooley says that it is in the primary groups' those of the family and neighborhood, that human nature is born and developed, meaning by human nature particularly sympathy and the innumerable sentiments into which sympathy enters, such as love, resentment, ambition, vanity hero-worship, and the feeling of social right and wrong (10, p. 29). Kerschensteiner considers it the function of the school to develop sympathy and the social sentiments and is using as his tool the *Arbeitsgemeinschaft*. Scott and Dewey represent the field of social education in American schools. Jane Addams and Charles Sprague Smith have developed a very important work in education among the less favored social classes. The Boy Scouts are attempting to develop these social sentiments in the workshop of the out-of-doors. All these present day movements, therefore, suggest the value of a study of the voluntary associations of Europe, to determine what the actual record has been, what they have contributed to social education. This paper aims to present the most important manifestations of the spirit of free association and voluntary organization in the life of Europe, during the period from the decline of feudalism to the triumph of the Reformation, as observed in its social and educational aspects.

Picture European society when feudalism was at its height. History was made by the nobles; they were Church and State. All the rest of the people were freemen or serfs, of little influence in public affairs. The course of history since that time has marked the rise, first of the freemen and then of the serfs, to a place of equal importance in State, Church, and Society. This remarkable transformation has been largely due to the organization of the lower classes into societies for the mutual protection of their welfare in education, religion and politics.

THE GILDS

Our study begins with the voluntary organizations formed

by the freemen or middle class, the first manifestation of which, outside the family, was the gild. It is known in history by various names because its early manifestations were as broad as society. For a correct understanding of its significance we must dissociate the name gild from any particular connotation, such as an organization of merchants, or a labor-union. The word gild is really as broad as the word society, used in its narrower sense, and its specific character may have been religious, scientific, social, or of a business nature. Frequently gilds served several of these ends.

In a primitive form gilds existed in the eighth century. They arose to supply wants which the family organization could not supply. Brentano (4), Hartwig (15), and Wilda (36) hold variously differing theories as to their original character, according as they see their archetype in the heathen sacrificial assemblies of the north, the Roman burial societies, or the early Christian societies which attempted to apply the principle of loving one's neighbor. The common element, however, which was perhaps the strongest motive power, was the love of sociability. J. Toulmin Smith says that the early English gild was an institution of local self-help, which, before poor-laws were invented, took the place of the modern friendly or benefit society, but with a higher aim; while it joined all classes together in a care of the needy and for objects of common welfare, it did not neglect the forms and the practice of religion, justice, and morality (32, p. xiv). The first three English gilds of which we have reliable and detailed records are those of Abbotsbury, founded and richly endowed by Orcy, a friend of Canute the Great (eleventh century), that at Exeter, and the gild at Cambridge. The capitularies of the Archbishop of Rheims, in 858, give information of gilds of that date in France in these words: "They shall unite for offerings (especially of candles), for mutual assistance, for funeral services for the dead, for alms, and for other deeds of piety" (4, p. l xxxi). These fraternities spread in the Middle Ages in great numbers, over all countries under the sway of the Roman Catholic Church. There were 12 in Norwich, as many in Lynn. Gallienus counts even 80 in Cologne, Melle about 70 at Lübeck, and Staphorst more than 100 at Hamburg (4, p. lxxxiii). Lambert says: "In Norfolk, the most densely populated county of England, Taylor is said to have counted no less than 909, and in Lyme Regis alone 75, though it is hard to believe that some exaggeration has not crept in here" (20, p. 106).

The most prominent characteristic of the early gilds was the religious element, because that was the form of social

activity most encouraged. A social organization entirely divorced from religion would have been impossible, if it had been conceivable. So no matter what the specific *raison d'être* was of any gild, it necessarily had a religious aspect. Each had its patron, in whose honor candles were burnt. Some had as their object the aid of poor scholars, the maintenance of schools or the payment of schoolmasters, the presentation of religious plays, as even to-day that at Oberammergau in South Bavaria, or the repair of roads and bridges. The Frith-Gilds had rules for helping the gild-brothers in every need. The statutes of the English gilds frequently mention loans made to needy brothers, with but one condition, that it be repayed when there was no more need of it.

The social character of the early gilds is shown, among other facts, by the rule that women might become members. They were generally the wives and daughters of members. Again one person might belong to several gilds. Liveries came to be generally worn at the annual festivals. The religious element of fasting was alternated with the more convivial feasts and drinking-bouts. Still greater witness is borne to their fundamental basis in the love of sociability by the fact that when the Reformation, as Brentano says (4, p. xci), shook the system of gilds to its foundation and they were abolished in all Protestant churches, on the ground of having been founded in superstition, they were re-established for social purposes, with the religious elements left out.

These early social clubs had gained quite a strong foothold among the middle class by the eleventh century. This and the following century witnessed the rise of the gild formed primarily for business motives, namely the merchant gild, or gild-merchant. The first organization of merchants occurred, however, somewhat earlier in Italy. The institution may be traced back to the corporations of merchants and artisans which existed in Rome under Numa Pompilius, which were called *collegia*, or *corpora opificum et artificum*. These *collegia*, which by their constitution could be mobilized for military purposes, also bore the name of *scholae*. They suspended operations from the fall of Rome until the ninth century. In 825 Emperor Lothair issued his *Constitutiones Olenenses*, wherein eight cities of northern Italy were named as suitable centres of population for the establishment of new *collegia*: Bologna, Cremona, Florence, Ivrea, Milan, Padua, Turin, and Venice. In Ravenna, in 990, corporations of butchers, fishermen, merchants and others were regularly organized. Rome and Ferrara also had their corporations. The *Florentine Compagnie* were formed to counteract the

power of the nobles. Each *compagnie* was made up of the families of merchants engaged in similar industries, and their work-people. In 1204 the guilds were a predominant power in the Florentine government. In 1236 a council divided them into the "Greater" and "Lesser" Guilds. In the upper class were: (1) Judges and Notaries; (2) Merchants of the Calimala; (3) Changers of Money; (4) Woolen Manufacturers; (5) Silk Manufacturers; (6) Doctors and Apothecaries; (7) Skinners and Furriers. The lower class contained 14 trades (33, p. 42).

In France the first gild-merchant was formed in 1070 at Mans, as a union of the free townsmen in order to protect themselves against the oppression of the nobility. The various names given the merchant guilds include *Amicitia* in Aire, *Vroedschapen* in the Netherlands, the *Hezlagh* in Sleswig, and the St. Canute Gild in Frensburg. Their original purpose was to obtain security from external danger, and to maintain peace in the interior of the towns. The development of commerce was paralleled by the increasing scope of the merchant guilds. For protection against bandits and against the nobility, alliances were formed between the merchants of different towns. The boatmen, or traders, of Paris formed the *Hanse des Marchandes de L'eau* whose privileges were confirmed by Louis VII in 1170, and those of Rouen formed the *Compagnie Normande*, which was dissolved by the king in 1458.

The merchant guilds are given the credit for the formation of the modern city. Brentano says there is documentary evidence that the gild of London was the model for the constitution given that city by Athelstan (4, p. xcvi). It is certain that the charters that constituted the communes were given by Louis VI and VII and Philip II to the local merchant guilds, which included in their membership all the free citizens. It was in the cities of the Hanseatic League, however, that the merchant guilds wrote their name most indelibly on history. The Hanseatic Confederacy was constituted of 80 of the most considerable places in Northern Germany and Holland, formed in the middle of the thirteenth century. Thus these simple social organizations, formed for mutual help, grew into giant commercial companies controlling rich city governments. It was the power of these organizations which sealed the downfall of feudalism.

At the time of their origin there was no differentiation between the merchant and the craftsman. The artisan sold his own goods. As specialization arose craftsmen and tradesmen separated and formed guilds of their own. The weavers were the leaders among craftsmen. The gild of

Weavers of London was chartered by Henry I (1100-1133), as was that of Oxford. The wool-weavers gild of Cologne arose as early as the eleventh century. The time of the organization of the craft gilds, in general, may be said to extend from 1050-1350. The craft gilds then were contemporaneous, or nearly so, with the merchant gilds, and in principle they were fundamentally the same. The merchants developed power more rapidly, however, and became oppressive. In fact, by an exclusive limitation of membership they developed a patrician aristocracy, which looked upon power as a lucrative monopoly. Political conflict arose between the craft gilds and merchant gilds, in which the former were finally victorious in England and the continent about the time of Henry VI or the middle of the fifteenth century.

Since our interest is in the social character of these organizations we may overlook most of their economic aspects. It is important to note that the rule of Florence that every boy 16 years old was obliged to become a member of a gild or trade corporation, was generally the custom throughout Europe. To some extent there was developed fraternity between gilds of the same trade, extending over large areas. The most renowned of these was that of the building-lodges of Germany, started by Dolzinger, chief master at the building of the Strasburg Cathedral. The journeymen of the different trades formed separate gilds, in some instances, as the Journeymen-Bakers of Copenhagen, founded in 1403. In France, according to Rosières (29, p. 437), *compagnonages* were formed in the hard times of the fifteenth century. A journeyman was able to enter the *compagnonage* of his industry in whatever city he was. They had secret signs.

In the broad field of social education perhaps no institution has served its generation better than the gild. It worked hand in hand with the church in the performance of religious training. As a philanthropic institution it was the popular means of furnishing assistance to those in need, by gifts of money and loans without interest, insurance, and the payment for saying masses for the dead. The gild fostered music and the drama. There were in England several gilds the object of which was to develop music. The *Feste du Pin* was a gild of minstrels existing in northern England during the fourteenth century. A century later there was a gild of minstrels attached to St. Paul's Cathedral (20, p. 132). In Germany the *Minnesingers* and *Meistersingers* were the great creators of folksong, and exemplify the part played in the life of the people by the singing gilds all over Europe. Even more common was the rendition of religious plays in the churches and gild halls.

In the support of the schools themselves there was no more active agency than the gilds. Leach (21) has collected the documents referring to schools during the reigns of Henry VIII and Edward VI. He says, "Of the 33 gilds mentioned in these records, excluding the craft gilds of London and Shrewsbury and the Merchants' gild at York, 28 kept grammar-schools; and to them may be added the Drapers of Shrewsbury, who kept a grammar-school; while the Mercers of London were trustees for three schools mentioned, and the Goldsmiths for two. . . . A gild being established, and maintaining, as it almost always did, one or more priests or chaplains to say grace for the souls of its members, which office, like that of burial of their bodies, was one of the chief objects of the gild, either *proprio motu*, or at the discretion of the gild, kept a school" (21, p. 34).

A broad social education, training for performing the offices of citizenship and of society was furnished by these brotherhoods. The membership of the gilds included the whole family. J. Toulmin Smith prints translations of the charters of many of the English gilds. From these it is evident that women were members of merchant and craft gilds as well as of the more truly social and religious gilds. At Kingston, the Gild of the Blessed Virgin Mary was founded in 1357 by 10 men and 13 women, 10 of them being wives of the men (32, p. 155). The Gild of Corpus Christi at the same place, founded in 1338, included 18 women among its 43 founders. Sons and daughters, according to their charter, might enter the gild without any payment of initiatory dues (32, p. 160). At York, in 1408, the Gild of Corpus Christi had a rule reading as follows: "All of both sexes will be received, if of good fame and conversation" (32, p. 141). Sisters as well as brethren are mentioned in the charter of the Gild merchant at Coventry, in 1340 (32, p. 226). Women belonged to the Gild of Kalenders, at Bristol; and this was primarily a body of clergymen (32, p. 287). The Gild of Fullers at Lincoln had women members in 1297 (32, p. 179). The Gild of Palmers of Ludlow, in 1284, enacted this interesting statute: "If any girl of the gild, of marriageable age cannot have the means found by her father, either to go into a religious house or to marry, whichever she wishes to do, friendly and right help shall be given her, out of our means and our common chest, towards enabling her to do whichever of the two she wishes" (32, p. 194). It would appear from the account given of the Scotch gilds by Bain, that the craft-gilds, at least, were more restricted in membership. Not until 1700, he believes, were females allowed to share in the privileges. About that time women were allowed to set up

in the tailor business in Aberdeen. The women were granted certain concessions and compelled to come within the jurisdiction of the craft, but were not permitted full membership (1, p. 256).

The same general conditions existed among the gilds on the continent. In Denmark the wives and daughters of gild members were also members, as sisters. The statutes show their participation in the banquets, sick-service, and funeral ceremonies, their offerings for saying mass, their contributions and penances (17, p. 133). Hegel says that women were most frequently mentioned in the early statutes, in Denmark (17, p. 133). In Upsala, the Erichsgild of the fifteenth century had sisters as well as brothers. "To the public feasts came also women and invited guests" (17, p. 338). The most famous of the Parisian brotherhoods was *La Grande Confrèrie, Notre Dame*. It was founded in 1220 with a membership of 50 priests and 50 laity. Women were not to be allowed membership, with the exception of the Queen, Blanca of Castile, the wife of Louis VIII, and other women who could not be refused without offence. Four years later, however, the membership rule was changed to permit the entrance of 50 women, who should preferably be wives of burgerbrothers (17, p. 100). The membership lists of the Wine-Brothers of Cologne, in the fourteenth century, contain the names of wives, widows and daughters (17, p. 349). The Baker-Gild of Göttingen, in 1316, had at least one woman member (17, p. 413).

It is thus evident that the gilds provided social life for old and young, and at the time of their greatest prestige included members of the nobility. In the last half of the fifteenth century there were 12 liveried companies in England, which included in their membership sheriffs and mayors. Edward III was a member of the Linen Armourers. In parts of England to-day are found survivals of the annual processions which most of the gilds held on the day of their Patron Saint. In these, liveries were worn, banners of St. George and the Dragon, and of the Patron, were carried.

As an organization serving the purpose of satisfying the longing for sociability the gild existed, therefore, much longer than it did as serving an economic function. The merchant and craft gilds degenerated, that is, lost their distinctive character as such, beginning in the fourteenth century, and by the time of the triumph of the Reformation had disappeared almost entirely. As wealth increased, the demands for candidacy were raised and membership tended slowly to become hereditary. The spirit of capital, petty rivalries, and hateful egoism began to take the place of the great idea

of association and solidarity under which they originated. The unimportant freemen of feudal Europe had become the rulers of the country, as wealth through trade and manufacture raised its possessors to a position of power equal to that possessed by those who inherited land. We will turn back now to trace the development of a different type of voluntary organization existing among the students of the period.

THE STUDENT SOCIETIES

We have mentioned the gilds of judges and notaries, doctors and apothecaries, organizing the practitioners in these professions. We found also Gilds of the Kalenders, or organizations of clergymen, which existed in almost every town. Their name is derived from their meeting-day, the kalends, or first of the month. There also existed gilds of scholars, generally known as universities. Rashdall says: "The rise of the universities is merely a wave of that great movement towards association which began to sweep over the cities of Europe in the course of the eleventh century" (27, V. I, p. 153). The student universities first appear among the non-Bolognese students resident at Bologna, representing an attempt on the part of the young men, who by leaving home had lost the protection of citizenship, to create an artificial citizenship. In exactly the same way foreign merchants and other strangers in an Italian town formed themselves into gilds, for the prevention of quarreling among themselves, and the promotion of their common interests. Denifle (11, V. I, p. 136) points out that there were *Universitates Judæorum* at Catania, Messina, Syracuse, and Trapani. Schulze (30, p. 9) calls the Bolognese organizations *landsmannschaftlichen Schutz-gilden* (national protection gilds). He points out the fact that the word *universitas* was used by other corporations, craft-gilds for instance, and not until the thirteenth century was it used to designate a school, which previously had been known as the *studium generale*. He dates the foundation of the University of Bologna as the middle of the twelfth century when the existence of the corporate tendency among the students first appeared (30, p. 9).

At Paris also the university was a modified gild; here of teachers, as contrasted to the gild of students existing at Bologna. Brunner (5) says that the prototype of the faculty organization at Paris is to be found in the craft gilds of German jurisprudence. Rashdall says that the masters were by a bond of customs formed gilds (27, V. I, p. 284). The idea of a corporation of teachers, he says, in all probability arose out of the idea of Inception, as perhaps

other gilds may have arisen out of similar initiations. Gradually the ceremony passed from mere jollification into a solemn and formal admission of a new master into an organized corporation of teachers. And the trades-union of teachers soon gained a monopoly. The similarity of the inception into the doctorate and into knighthood is evidenced in some of the Spanish universities where the new doctor was actually invested with a sword; in all universities the ring formed one of the insignia of the doctorate, and at Vienna the preliminary bath of the candidate for knighthood appears to have been imitated by candidates for degrees. The degree at that time had more the significance that it bears now in the secret fraternity or lodge than that borne in the university. The degree was granted at the commencement of the teaching career and was the sign of admission to the profession.

The earliest universities, then, were voluntary organizations, bearing most of the characteristics of gilds. There were two types, the Bolognese, where the initiatory steps were taken by the students, and the Parisian, where the teachers were dominant, and the students were what Dolch calls *Angehörige* but not *Mitglieder* (12, p. 25); nominally they were members, but actually they had but very little power. Later universities were of a mixed type. To be sure there was less differentiation at that time between those who learned and those who taught.

The different authorities present different pictures of the organization of the universities, largely because of the fact that the organization was very loose, and that it changed its character with the years. Schulze gives a very good diagram outline of the *studium generale Bononiense* (30, p. 10). The Studium Generale was divided into The College of Doctors, The Student Organization, and the College of Theology. The division of the Student Organization is shown in the following diagram:

Universitas Scholarium

Law Corporation		Arts Corporation	
The Citramontanes	The Ultramontanes		
3 Nations	14 Nations		

The early student body consisted of law students from outside of Bologna. The Arts Corporation developed subordinately and the Theology Corporation was not connected with the university until 1362. From the middle of the thirteenth century the Law Corporation consisted of two distinct but allied gilds, or as they were actually called, universi-

ties, the *Citramontanes* and the *Ultramontanes*. These were made up of *nationes*, groups of students coming from different territorial divisions bound into clubs. The number of nations varied from time to time, the *Ultramontanes* containing as many as 14; the *Citramontanes* containing only three. The College of Doctors, or the teachers, were not included in the *Universitas Scholarium*; they formed a separate gild.

In early days the nations, which may have antedated the two federations, were distinct corporations with statutes, officers, and meetings of their own. But with the exception of the Germans, they later lost much of their autonomy. Charles V granted the German nation his especial protection, and gave their procurator the rank of Count-Palatinate. Pope Gregory XIII granted the German students all privileges and freedoms of the *Bononischer Senatore*. Another right of this nation was that every fifth year the rector should be chosen from among them.

Every nation elected at its head a proctor, or procurator, and one or two *consilarii*. These national associations retained the more homely nature of clubs for mutual protection, assistance, recreation, and for the performance of those religious functions which in the Middle Ages supplied the sanction for every social bond and the excuse for every convivial gathering. In the statutes of the German nation the object of the gild is declared to be: "the cultivation of fraternal charity, mutual association and amity, the consolation of the sick and support of the needy, the conduct of funerals and the extirpation of rancour and quarrels, the attendance and escort of our *Doctorandi* to and from the place of examination, and the spiritual advantages of the members" (27, V. I, p. 161). The treasury was supplied by entrance fees, and was depleted by convivial and religious expenditures.

At the head of the university was the rector, just as the other gilds had their rector. He was required to be a secular clerk, unmarried, wearing the clerical habit, of five years standing in the study of law, and at least 24 years old. In the sixteenth century the rectorship declined. On account of the expenditure attached to the office it was hard to get candidates. The whole student body met in a congregation, with a constitution.

In the institution of rector at Bologna we see the embodiment of the supremacy of the student gild over that of the faculty. In the early days the students did not control the situation, but the two gilds existed side by side, each with its own rights. The Doctors of Bologna formed their gild as early as did the Masters of Paris, and always maintained their right to determine the examinations into the qualifications

of candidates for admission into the profession. It was merely by accident that the students appropriated the term *universitas*, and the Doctoral Gild became known as a *college*. The students, however, were mostly mature men, as contrasted with the boys at Paris, many of them being of noble and clerical rank. The professors were not lecturers of an established institution but were often private adventurer lecturers. The discipline of students was thus free and easy, but for the professors it was very strict. The teacher was fined if he broke any of the numerous rules, for absence or tardiness, or failing to cover the entire mapped-out curriculum. The professor had to take an oath of allegiance to the rector. In fact, the professors and the town authorities were bound to give the students their privileges; otherwise they might move to some other city, as they did at Prague in 1409. There was no university property. The general congregation and meetings for religious observances were held in the cathedral.

The foundation of Paris University in the reduction into a regular code of the unwritten customs of the Gild of Masters, or professors, was not earlier than 1150. Schulze (30, p. 9) outlines its organization as follows:

PARIS UNIVERSITY

THE THREE HIGHER FACULTIES

- I. Theology.
- II. Jurisprudence.
- III. Medicine.
- and
- IV. The Faculty of Arts.
(comprising four nations)
 1. Gallic or French.
 2. English (later German).
 3. Picardian.
 4. Norman.

At Paris the Faculty of Arts was dominant. The term *nation* was first used in Paris in 1222. They were four in number: (1) French, including Spanish, Italians, and Greeks; (2) English, after 1430 the German, including both nationalities; (3) Picard, including those from the northeast and the Netherlands; (4) Norman (23, p. 78). The common rectorship was instituted by the united nations. Rashdall considers the evident purpose of the organization as that of gaining protection against oppression by ecclesiastical authority. Much later the four nations were subdivided into *Provinces* of *Tribes*, which had regular Deans at their head, and the votes of the national congregation were taken by provinces. Each

of the higher faculties had a *Dekan* at its head. The rector had come, at least by the middle of the fourteenth century, to be the incontestable Head of the University, as well as of the united Faculty of Arts. Each of the Faculties constituted an autonomous corporation with its own Head, Bedels, Receivers, common seal, congregations, statutes, etc. But all scholars and graduates of the three superior faculties, with the exception of the masters, remained under the jurisdiction of the nations. The general congregation was composed of the masters of all the faculties, Theology, Jurisprudence, and Medicine each having one vote, and each nation one, thus giving the Arts Faculty four votes. The common treasury was filled by fees from new members, and any surplus was expended in a nearby tavern.

Another institution important in the study of voluntary organizations, because it developed into what we now call the college, was the self-governing *Hospicium* of Paris. The students of moderate means, before the establishment of the endowed *hospicia*, *bursen* or *collegia*, lived in groups with a master. The rich students lived in houses of their own with a private tutor, and the poorest herded together in some miserable garret. Rashdall's evidence seems to support the thesis that: "The original *hospicium* was a democratic, self-governing society, that its Head owed his authority to the free election of his fellows, and to the formal Statutes or traditional customs accepted in the Community, and that the Community always participated in the management of the common funds and the general government of the House" (27, V. I, p. 481). Gradually the university authorities transformed this régime into an absolute monarchy by organizing endowed colleges. The first was the *College des Dix-huit*, founded in 1180 (27, V. I, p. 483). The independence of the University of Paris lasted until the reign of Louis XI. In 1474 all the privileges of the university were suspended.

Bologna was the model for the formation of the other universities of Italy and Spain. Vicenza was founded by a migration from Bologna, in 1204. Five years later it had four rectors and as many Student-Universities. Another migration from Bologna in 1222 founded the University of Padua. In the other Italian universities the control quickly, if not from the time of foundation, passed into the hands of civic authority. In the later universities of Spain the constitution may be described as mixed, but on the whole belonging to the Bolognese rather than the Parisian type. At Salamanca rectors were elected in 1263. Masters and students were recognized as forming a university, which was to elect a rector whom they should all obey. He was required to suppress feuds and quar-

rels among the students and townspeople, or among the students themselves, and especially to enforce those cardinal but seldom observed rules of mediæval university discipline—that students should not bear arms or walk abroad at night. The old student liberties were better preserved in these Spanish sixteenth century statutes than in the Italian universities themselves. The statutes of 1300, at Lerida, show the student liberties and their domination over the professors in full operation. The Church exerted a greater control, however. All the Spanish universities, moreover, were created by the Crown, and are peculiar for their close relationship to the State.

The French universities were originally of Parisian type, later adding some of the Bolognese features. Such were Montpellier, Orleans, Angers, Toulouse, Aix and others. St. Andrews, in Scotland, in 1411, resembled the later condition of Orleans and Angers. Masters and students united in four nations. Fife, Lothian, Angus, Aberdeen, Glasgow, Clydesdale, Teviotdale, Albany, and Rothesay were theoretically founded on the same line, but here the nations were of much less importance.

Parisian example was early imitated at Oxford. There were, however, only two nations, the *Boreales*, those living north of the Trent, and the *Austales*, those living south. The two proctors were first heard of in 1248. After 1274 the term nation ceased to be used. At Cambridge there is no record of nations, but that may be because all the records were burned in the town and gown riots in 1381.

The first German university was Prague, founded largely on the Parisian model, as were the other universities of Germany, though in these schools the students were much more powerful than at Paris. At Prague and Vienna there were four nations subdivided into provinces. At the head of the nation stood the *Procurator*, of the province stood the *Dekan*. The union of procurators chose the rector of the university, according to Barnstein (2, p. 10), though Rashdall says that at Vienna the students and masters all participated in the election of the rector. Later however, he adds, this power was concentrated in the masters (27, V. II, p. 217). Here is a point on which the authorities differ. The historian Raumer (28, V. VI, p. 18) furnishes evidence which seems to discredit Rashdall, by referring to the charter of foundation issued to Vienna by Duke Rudolph in 1365, and the definition made by the university itself the following year, in which it was expressly stated that their model was the University of Paris. The names of the four nations given at that time were: (1) the Southern; (2) the Saxon; (3) the Bohe-

mian; and (4) the Hungarian. This division was modified by Duke Albrecht in his charter of 1384, making the (1)st Austrian; (2) Rhenish, including Bavaria, Suabia, Alsace, Franconia and Hesse; (3) Hungarian, including Bohemia, Moravia, and Poland; and (4) to include Saxony, Westphalia, Prussia, etc. At Prague the names of the nations were: Bohemian, Bavarian, Polish, and Saxon, according to the division of Charles IV, in 1348. The later being almost exclusively German outvoted Bohemia in university questions. This irritating the Bohemians, they petitioned the Emperor Wenceslaus in 1409, with John Huss and Jerome of Prague at their head, to decree that henceforth the Bohemian nation should have three votes. This led to bloody strife and a migration of 5,000 German students and masters from Prague to the city of Leipzig, where they founded that great university.

At Leipzig the four nation system was established and retained its hold until 1830 (2, p. 64). They were called the Meisnian, Saxon, Bavarian, and Polish. Ingolstadt was founded in 1472 with four nations, the Bavarian, Rhenish, Frankish, and Saxon. Erfurt, founded in 1379, was the first of the Parisian type in whose constitution the nations disappear entirely. At Heidelberg, Paulsen assumes that they had no real importance, though such a division is mentioned in the foundation charter of 1385 (27, V. II, p. 248).

In place of the national type of organization the *bursen* appear as the characteristic development of the fifteenth century (2, p. 11). In Germany, however, instead of being endowed dining-halls for poor students as at Paris, they were *privatpensionates* the use of which was obtained by force. At the head was a *bursenrector*. Each new member must pledge to obey the rules. Only Latin could be spoken in the *bursen*. Most of them were not schools of diligence and virtue, Barnstein says, but of idleness and vice (2, p. 13).

The University of Cracow, founded in 1364, was entirely of the Bolognese type, and full student rights were conferred. Pressburg was also of this general type.

These great voluntary organizations which started the university movement reached the height of their development in the cities where they originated, at Bologna, the great student gild, copied in Italy, Spain, and Poland, and at Paris, the great teacher gild, imitated in France, England, Scotland, and Germany. In Germany the nations played but a small part; as Schulze says, naturally giving the dominance to the teachers in the faculties and the *bursen*, and the passive choice of the scholars in the university congregation had practically only a decorative value (30, p. 55). As a matter of fact the German universities, those of Scotland, Scandinavia, and to

some extent those of Spain, were formed by the decree of state or church authority, and on this account the nations were not the spontaneous groupings found in the earliest universities.

As a result the students formed organizations of their own. Not having the important affairs of the university to attend to, they performed the other important function of supplying satisfaction of the social needs. These societies were more or less secret, according to expediency. In 1477 at Pavia, and in 1514 at Leipzig these formerly unknown organizations came to light. At that time secret or public unions were forbidden, either within or without the community. Thus the custom of initiation or *bejaunus* was at first prohibited. But as Rashdall says: "It gratified alike the bullying instinct, the social instinct, and the desire to find at once the excuse and the means for a carouse" (27, V. II, p. 628). Later this custom became tolerated and finally prescribed for all new students. An initiatory ceremony peculiar to Germany was known as the *deposition*. This developed into a system of *pennalism* which made the freshmen veritable slaves of the older students. As these customs were not definitely associated with any voluntary and systematic organization, but existed more as school traditions, they need not be more fully described here.

LEARNED AND RELIGIOUS SOCIETIES

Closely associated with the student societies were the learned academies. Conradi has gathered together material on this subject, covering the field very thoroughly (9). Learned academies appeared with Humanism in Italy, and spread into Germany and France, where they developed religious characteristics. It was here that heresy was very often born and cultivated. Many had as their avowed purpose the cultivation and purification of the vernacular language. It was impossible, however, to prevent among these intellectual leaders discussion of the newer conceptions of science and philosophy. There was therefore a close connection between the learned societies and the heretical sects of the Reformation. Conradi includes the Bohemian Brethren and the Waldensians in his list of learned societies. The most accurate method of treatment, therefore, is to take them as they existed without attempting to dissect them, or separate the educational from the religious elements. Ludwig Keller says: "From the earliest Middle Ages the Christians formed themselves into guilds and brotherhoods of handworkers. They were, far into the Middle Ages, looked upon as heretics, largely because of their secret characteristics; certain ideas and forms which were prescribed secretly by hereditary transmission. Döllinger, in his *Beiträgen zur Sektengeschich tedes Mittelalters* says that

the *Manicäher* had their strongest adherents among the weavers of Toulouse and that neighborhood, who were in the local folkspeech called *Arriens*; on that account the sect was given that name'' (19, B. 5, s. 95).

The most important of these early sects of heretics was the Waldensians. They probably began existence with Valdo of Lyons, in the twelfth century. Their stronghold was in the Piedmont and the secluded valleys of the Alps. The first measure for their general destruction was taken in 1209 (24, V. I, p. 28). Keller says that to these is due the introduction of a secret sign of recognition in mutual greetings and hand-shaking. Many adopted these signs after the persecution in 1387. The men's grip was given through a sign with the little finger. The women touched the finger-tips (19, b. 6, s. 341). Notwithstanding horrible persecution, they continued their social and community life through the centuries and still possess their Alpine valleys. Other opponents of the Papacy at this time were the *Cathari* or *Albigenses*.

In the same century the Bequine system of societies arose. As we follow this group of thinkers we see the formation of the Sect of the Free Spirit in the thirteenth century, and the Brothers of the Common Life, founded by Groot and Radewins about 1380. These latter gathered some people and formed a close community, occupying themselves with copying books and manual work. They built the first Fraterhouse and the first Sisterhouse. In distinction from the earliest houses of Bequines, community of goods and a more monastic life prevailed. They spread quickly, especially in Netherlands and northern Germany. Among others of their members was Thomas à Kempis.

The Hussite societies began about 1400, and in Great Britain the Lollards arose. Hussites and Waldensians allied, and many small religious societies sprang up as variations of these movements, such as, for instance, the Winkeliers. More or less consecutively the Hussites developed into the Bohemian and Moravian Brethren.

Meantime the Italian academies were being organized. Conradi gives Plethon (1355-1450) credit for fathering the Platonic Academies (9, p. 394). Through his influence the Florentine Academy was founded. Brandi says that it had no constitution nor organization, but the bond that held the members together was love of learning, supplemented by the personal influence of the Medici (9, p. 396). The Academy met in the villas of the neighborhood and held an annual banquet on Nov. 7, Plato's anniversary. Numerous other academies, perhaps 700 in number, were formed similar to that at Florence. The Roman Academy is associated in its

origin with Laetus, who was born in 1428. The close relation between the academies and the sects is evidenced in that the Roman Academy was dissolved in 1468, because of trouble with Paul II over heresy. It was re-recognized three years later by Sixtus IV and large numbers joined it. Besides this public academy, however, in which high scientific ideals could with difficulty be furthered, there was a separate though inner secret academy, also under the leadership of Laetus. In these societies friendly sociability was present as well as literary debate.

In Germany the name standing out most prominently as an organizer of literary societies was Celtis (1459-1508). The *Sodalitas Rhenana* or *Celtica* was formed between 1487-91, a humanistic society which brought together the noblest minds of the Rhine country. The Society of Vienna was the centre of humanism in the valley of the Danube. Other societies followed in other cities. They devoted themselves to poetry, the publication of classics, the cultivation of the vernacular; but some of their members devoted themselves to astrology, cosmography, alchemy, etc. Some were printers, sculptors and painters. Others of these societies devoted themselves more exclusively to the discussion of religious questions, the most famous being the Bohemian Brothers and the Anabaptists.

The Bohemian Brethren received definite organization about 1456. A century later they were expelled from Bohemia, and seven years after this formed a durable union with the Genevan Church in Poland (6, V. II, p. 636). "The evangelical churches of this period had three degrees of membership, *Socii*, *Fratres*, and *Perfecti*. The *Perfecti* elected the members who supervised the whole temple. The *Fratres* formed a kind of academy. Keller thinks that many churches consisted of only *Socii* who did not know that they formed part of a ring of heretics." Conradi adds, "Often these churches, especially when religious storms were raging, existed only as literary societies, or as inner circles of legalized organizations, laboratories of princes and printing offices" (9, p. 405). The Bohemian Brethren cultivated music and poetry, mathematics and natural science as well as the vernacular, and aimed also to be apostles of good will among men. The life of Comenius illustrates the nature of the work done during their later history.

The other important religious sect at this period was that known as the Anabaptists. They were in sympathy with the Bohemian Brethren in most doctrinal questions. Keller tells us that adult baptism was practised by various craft guilds, by the *Meistersingers* and by some of the academies of natural philosophy, in their ceremony of ordination (19, b. 5, s. 99).

As a distinctly religious movement Anabaptism began with Nicolaus Storch, Marx Stübner, and Thomas Münzer, who arose as reformers in 1521. Baptist communities became very numerous. There were 86 in Moravia between 1526 and 1536 (16, p. 68). The peculiarity of these societies was their communism. Large dwelling-houses were built which contained from 400 to 600 persons; one numbered 2,000. Under the system which Huter is mainly credited with developing, there was over each household one who took the general superintendence. Each household had a common kitchen, a common bakehouse, a common brewhouse, a common school-house, a common room for child-birth, another for mothers with young infants, and a common nursery with community nurses. Other sisters attended the sick. The young folks were strictly kept from the world, no mixed marriages being allowed. No idler was permitted in the community. The meals were common, but each family had its own rooms. In the morning after silent prayer, they all went to work, some in the fields, some in the workshops. They put their wages in the common box, which was under the care of a treasurer. It is said that the Moravian communities at this time numbered 70,000 persons (16, p. 70). In 1535 they were driven out of Moravia and Huter was burned at the stake.

Baptist communities were organized all over Germany and the Netherlands. The most famous was that at Münster, where in 1534 they got control of the city and established a community of goods. They resisted the established church for a year but finally the city fell, and a terrible slaughter ensued. Minor divisions of Baptists split off in different directions. Among these were the Melchiorites and the Mennonites. To follow out this line of historical development would lead to the formation of the religious societies of to-day, Lutherans, Episcopalians, Presbyterians, Huguenots, Congregationalists, Friends, etc.

At the time the Bohemian and Moravian Societies were suppressed there were two important types of societies in Germany, the *Sprachgesellschaften* and the Societies of Natural Philosophy. The most prominent of the former class were the *Fruchtbringende Gesellschaften*, sometimes called *Der Palmbaum*. Their purpose was furtherance of good conduct and improvement of the German tongue. Their chief literary work was translation, with emphasis laid on form. Two German grammars were produced, one by Schottel and one by Gneinzus. The *Palmbaum* was secret, being unknown during the first thirty years of its existence. In 1673, when first publicly known, it had 789 members, of whom some were German princes and a number were scholars like Opitz. Other

language societies modeled after these were: (1) *Die Aufrichtige Gesellschaft von der Tannen*, 1633; (2) *Die Deutsche-Gesinnte Genossenschaft und Die Neun-Stündige Häussenschaft*, founded by Zesen, 1643-4, in Hamburg; (3) *Die Pegnitz-Hirten Gesellschaft*, founded in Nürnberg by Harsdörfer in 1642-4; (4) *Der Elbische Schwanen Orden*, founded by Rist in 1656.

The seventeenth century saw the establishment of the societies of natural philosophy in all the principal centres of population. As to their influence I may quote Keller: "These secret working unions of learned men, poets and philanthropists have had greater influence on the development of the mental life than was formerly recognized. These free academies to which such men as Bacon, Boyle, Galileo, Leibniz, Comenius, and others belonged, and of which Cromwell, Oxenstierna and other statesmen were members have been the transmitters of general philosophical and religious thought" (19, b. 5, s. 67).

A description of the various orthodox societies within the church might have been included, beginning with the Benedictines (sixth century) and their offshoots, the Carthusians, the Cistercians, Grandmontanes, Clugniacs, Premonstratensians, Feuillans, Trappists, and Maurists, and the two great movements of the thirteenth century, the Dominicans and Franciscans, and that other powerful organization, the Jesuits. These societies had great social influence and were the founders of many schools. To a certain extent they were voluntary organizations. Their effect was conservative and reactive, and being the backbone of the Church, association for protection was unnecessary, association for philosophical and literary argument uncongenial, for the practices of sociability unclerical. They were of less importance, therefore, in the great evolutionary movement which was the great effect of the guilds, the universities, the learned and religious societies.

SUMMARY AND CONCLUSION

It is very evident that histories of education and social life have not appreciated the service rendered by the voluntary associations of the people to the development of modern civilization. Through spontaneous organization merchants were able to successfully combat the oppressive nobility, to obtain from them charters for cities, and finally a part in the national governments. Craftsmen by union developed an efficient apprenticeship system and skilled workmanship, built the great cathedrals, and ultimately became the captains of industry. These and the more truly social guilds supplied the recreation for the great mass of the population, and cultivated

art through the drama and music. They were the agency for inculcating the spirit of co-operation, and mutual helpfulness, and to a great extent determined the standard of social ethics. The voluntary organizations of students and teachers became the universities, the preservers of ancient culture and the source of higher learning. The Reformation was due not alone to individual leaders, like Luther, Calvin, and Zwingli, but to voluntary organizations like the Bohemian Brethren and Anabaptists. The evolution of scientific thought was due very largely to the learned societies and the discussion which they stimulated. Keller says, moreover, that it is in these societies, and not in the universities, that we may look for the birth of the newer German literature (9, p. 417). Those who would emphasize social education to-day, therefore, may find in these *Arbeitsgemeinschaften* many suggestions of value in the solution of present day problems.

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WHAT IS EDUCATION

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I

The problem of education is of such magnitude, importance, and difficulty that all through the ages it has claimed attention, but has not been satisfactorily solved. The high mark of disagreement is reached when our leading thinkers attempt to answer the question: What is Education? For proof of this statement we need but turn to the history of education. Every pedagogical writer formulates his own aim and works out his own principles to support this aim. One aim is pietistic; a second is practical; a third is philosophic; a fourth is scientific; etc., etc. And to one's great surprise, they all claim to be right. Thus Montaigne and Locke firmly believe in physical education. Rousseau points out the principle of adaptation to nature. Basedow, Campe, Salzman, Trapp, and Dositheus Obradovich plead for happiness and usefulness in life. Herder is for the humanities; Spencer and Francke for piety and holiness; Niemayer for perfection and harmonious development; Pestalozzi for the training of the mental powers and general human education; Diesterweg for self-activity for the sake of truth, beauty and goodness; Runholzer for freedom and goodness; Denzel for self-culture; Krug for a strong intellect and a free will; Herbart for moral character; and so on *ad infinitum*.

I could continue this enumeration, including ancient as well as modern educators, but it would be difficult, indeed, to find a single case of agreement. This does not mean that all hope is lost. Other sciences have been in a similar chaotic condition, yet they have developed into what they are to-day.

Scientific pedagogy may be called the scientific expression of every movement that contributes to education, both in theory and in practice. Each movement tried to force its aims and principles upon the current pedagogy. Not only this, but other movements were not tolerated. These historical contrasts in the aims of education are due to: (1) the natural sciences, (2) philosophy, (3) religion and ethics, (4) politics and national influence. All these made their due claims upon the curriculum and won out. All these educa-

tional doctrines are neither fortuitous ideas nor events without significance. We have to study them most carefully.

II

All these conflicting historical conceptions and aims of education we may classify under the following pedagogical movements.

1. THE INTELLECTUAL MOVEMENT IN EDUCATION

As its name suggests, this movement is for intellectual education. The highest kind of intellectual education is that which trains the reason for the sake of developing judgment and logical thinking. The ideal was the scientific schooling of the child. The child's judgments are to be based as much as possible on his own experience and elementary knowledge.

This movement originated in a false metaphysical psychology which claimed that psychical life consists of ideas. It was supported also by the false and one-sided conception of virtue. It had its champions even among the Greeks. Socrates believed that knowledge is virtue. Aristotle, on the other hand, separates knowledge from virtue. Intellectualism was accentuated in mediæval times by Descartes and Spinoza. To them the process of thinking was of primary importance, and feeling (emotion) and volition were but phases of thinking. The latter claimed that complete development of thought and reason is manifested only by those who show full control of their passions.

The central idea of the Renaissance was that the knowledge of virtue makes virtue. Leibnitz, Wolff, and Hegel supported this view. Kant was opposed to it. Basedow said that through reason the reason must be developed. Pestalozzi was also an intellectualist, but only in his "Lienhard und Gertrud." He hoped to kill superstition by intellectual enlightenment. Later he changed his educational doctrine to become the greatest exponent of the so-called pedagogical formalistic movement.

2. THE UTILITARIAN PRINCIPLE IN EDUCATION

This pedagogical utilitarianism is a sort of subdivision of the intellectual movement. Many philanthropists, especially Basedow and Francke, were in this movement. Herbert Spencer was also an ardent supporter of this movement but, of course, from the standpoint of practical evaluation. Herbert included some of this utilitarianism but it was strongly colored with ethicism.

3. THE ÆSTHETIC MOVEMENT IN EDUCATION

This is a very old movement. Among the ancients æsthetic education was the chief and only aim. The ability to speak, to dance, to sing, to wrestle, etc., was the goal of the Greeks and Romans. In the 19th century, a group of artists brought this movement again to the surface. They believed that this education is not only æsthetic, but that it is also moral. Schiller and Schelling are the great representatives of this great movement. They are entirely too extreme in their statement that art is the highest accomplishment of man. Many of the modern philosophers are of the same opinion. Among these are Schopenhauer, Richard Wagner, and Nietzsche.

Even to-day this movement has a strong hold on educators. Konrad Lange, Seemann, Lichtwark, Hirt, Linde, C. Schubert, the Dresden Congress of Educators, and many others argue vehemently for this movement. But this movement and its supporters are very presumptuous. It is presumptuous to ask that all school children be trained as dilettanti, acquiring the artistic sensibility without putting it into practice. It is presumptuous to require all school children to be sort of middlemen between art and the common people. It is presumptuous to believe that a child can make use of the general principles which are dominant in our nature. A uniform education of all the people is a Utopia. It is a presumption to act on the belief that a uniform education of all people will enable them to see all that is beautiful and strive for all that is good and true.

4. PEDAGOGICAL ETHICISM (Ethical aim in education)

This is a one-sided ethical movement that is brought to the support of certain pedagogical aims. It accentuates ethics, which is strongly advocated by Kant. Kant says that the moral nature, the ego, is the most important thing in man. The fulfillment of a moral duty is, therefore, the highest aim of education. Other supporters of this movement were Fichte, Lotze, Schleiermacher, and Herbart.

5. PEDAGOGICAL CONFSSIONALISM (Sectarian religious aim in education)

This movement was championed by many pietists and some philanthropists. Later it was revived by Palmer and Graser. Confessional Christianity formulated the aims and theories of school instruction and education. This movement is still upheld by many Catholic Theologians.

6. PEDAGOGICAL HUMANISM AND REALISM

This movement has more to do with secondary than with

elementary education. Realism requires that all education be placed on a realistic basis (natural sciences and modern languages), while humanism demands instruction in the classical languages (Latin and Greek), literature and history. This movement is still very strong in Europe. But its field and influence are limited more and more by the recognition of the natural sciences. In many of the European "Reform Gymnasiums" the natural sciences are given precedence over the ancient languages.

7. PEDAGOGICAL INDIVIDUALISM AND SOCIALISM—INDIVIDUAL AND SOCIAL (CULTURE, UNIVERSAL) PEDAGOGY

This contrast comes from politics and not from pedagogy. The second cannot crowd out the first, because social pedagogy is based on pedagogical individualism. The representatives of Pedagogical socialism are Natorp, R. V. Stoy, Bergmann, Auguste Comte, Rissman, Scherer and others. Natorp in his *Sozial Paedagogik* believes with Pestalozzi that the aim of education is socialization. The determining factors of education are found in the community. He believes that the apparent hiatus between pedagogical individualism and pedagogical socialism may be bridged by the fact that the community is indissolubly identified with individuals, just as the individuals are ever part and parcel of the community. Pedagogical individualism, on the other hand, starts with the relation between teacher and pupil, and not with the relation between school and society.

Since its birth, in the middle of the 19th century, social pedagogy has claimed that the individual conception of education is superfluous. The individual as such, does not exist. The individual is a pure abstraction. We know that all sciences deal with abstract terms. If an object or natural phenomenon is to be treated scientifically a good many abstract terms will be used. Social pedagogy deals also with abstract terms or concepts: society, community. According to this pedagogy society is something real; an individual man does not exist, he is only an abstraction. But we have to keep in mind the fact that the term abstraction has two meanings: First, abstraction is putting out of view the concrete conditions in observing concrete facts (objects and phenomena). Second, abstraction is the process of building up abstract logical concepts. The false conclusion of social pedagogy is due to the confusion of these two meanings. Many social pedagogues do not care for this distinction. The summation of pure phenomena cannot lead to something real. According to Bergmann's "*Sozialpädagogik*" society is real and the individual is phenomenal. But we know that ethical problems

are always studied with reference to individuals and later with reference to society or applied to it. Social pedagogy must perforce await the development of individual pedagogy and then serve to supplement it.

In order that social education be recognized and developed beyond the somewhat narrow limits established by Natorp and Bergmann, O. Willmann in his book: "*Didaktik als Bildungslehre*" proposes a conception of civilized life which is to supplement not only egoism but also altruism (sympathy) by an appreciation of social associations. According to this theory, the possessions which are transmitted by means of education and instruction represent not mere collections of separate entities, but rather organic forms endowed with inherent life, and even the most minute details of pedagogical theory must be imbued with this idea.

According to individual pedagogy, the teacher is the educator, the moulder of the child. According to Willmann's social pedagogy, a teacher is the representative of previous generations, the culture possessions of which he is to give to the child. "Education is nothing more than a transmission of culture wealth from one generation to another," says Willmann. A teacher is the representative of a social will which has to be realized in an individual by means of the total consciousness of society or the state. In this sense, all state employees are to some extent teachers to the individual.

The main point in social pedagogy is the duty or loyalty of the individual to society. Individual pedagogy looks to the school as the means of educating the child; social pedagogy says that the school is only the result of social organization. According to individual pedagogy, the aims and purposes of education are individual ideals toward which the teacher is working; the aims of social pedagogy are expressions of the total will of the community and state. The whole educational problem depends upon the point of view from which it is solved. The specific educational problems fall under the individual point of view (relation between teacher and child). Social pedagogy deals only with the relation of pedagogical facts to any other department of life. Moreover, in social pedagogy, the purely pedagogical problems are not touched at all. The only value of social pedagogy is its influence in supplementing the individual pedagogical problems; it can never serve as a substitute for individual pedagogy.

The relation between teacher and child is the prime factor in all pedagogy, and this relation is an individual one; a relation between individual and individual. This relation may later take into account the community, but first and fore-

most the relation is purely individual. There may be many pedagogical facts which cannot be solved and are not even touched by social pedagogy. I mean here all those problems which arise from the child's psycho-physical nature. These problems are treated only by individual pedagogy, the representatives of which are very numerous:—Meumann, Stern, Schulze, W. E. Lay, Thorndike, Colvin, Burt, Burnham, Partridge, Whipple, Seashore, Winch, Scripture, Goddard, Binet, Simon, Schuyten, Swift, Messmer, Henri, Biervliet, Claparède, Netschajeff, Roumyanzeff, Sancte de Sanctis, and many other American and European original contributors.

8. PEDAGOGICAL FORMALISM AND MATERIALISM—DEVELOPMENT OF MENTAL ABILITIES OR KNOWLEDGE AND SKILL

This educational conflict is still unsettled. According to the formalists the aim of education is to develop the child's mental powers: attention, memory, observation, reason, imagination, will, etc., regardless of what material or subject matter is used. Formalism does not believe in teaching history, natural science, geography, etc. Its object is only to develop and train the child. The teacher is to develop the child's abilities in the very best ways, by the very best methods, regardless of how many facts he pounds into him. If during this development one can use means which at the same time teach facts, so much the better. The culminating point of this theory was reached by the great "father of modern pedagogy," J. H. Pestalozzi.

The public school of to-day considers primarily the evaluation of knowledge and skill; it is materialistic in its curriculum. But both of these extremes are one-sided. Here we must thoroughly understand what is meant by intellectual education. It must be discussed on a pedagogical basis showing that there are immediate (primary) and mediate (secondary) aims of education. In school, formalism and materialism, as well as other pedagogical principles, must be based on scientific investigation.

III

What is the *scientific* movement toward defining the nature of education? There are three scientific conceptions of education:

1. *One-sided Historical Conception of Education.* This movement is championed by Otto Willman. Very much like social pedagogy, it considers education as a tradition and transmission of the thoughts and ideals from one generation to another.

2. *The Psychological Conception of Education.* The followers of this conception argue that education is but applied psychology. Most of these are either too engrossed with the subject of psychology or they are poor practical teachers. Münsterberg rightly ignored all such pedagogies. However, recently, in his book "Psychology and the Teacher," he abandoned the idea of autonomy of education as a science. Meumann and his school clearly show that the point of view in pedagogy is different from that in psychology. Yes, pedagogy has to make its own bread and not wait for the crumbs falling from the tables of the psychological laboratory. To-day there should be few who agree with Sully, who openly says that the real and only business of the teacher is to take the "principles" of the psychologist and to clothe them with "concrete" and "practical" illustrations. Why, is it not true that to different systems of psychology correspond different systems of education?

3. *Evolutionary Conception of Education, or, Developmental Pedagogy.* This movement originated with Herbert Spencer, who tried to apply the principles of evolution to all the sciences and to education as well. In his book on "Education," however, he is very brief with his biological principles and too general. The first assumption of all education is the education of man according to the dictates of nature. The natural education we receive without our knowledge or will. Therefore, pedagogy is to have a biological basis. Consequently, education is a planned and guided development according to natural biological laws and conditions of evolution. But what is this development? It is the observation of *conditions* and *processes* (according to Spencer *evolution* includes both growth or a gradual, natural increase of bulk, and *development* or an equally gradual natural change of structure, form and self-mobility). What are these conditions and processes? The conditions are:

a. VARIATION—continued changing of the individual; individual variation is the main consideration.

b. ADAPTATION—every individual adapts himself to conditions of life.

c. PURPOSIVENESS (Baer's "Zweckmässigkeit"): all evolution shows a tendency toward perfection. (Of course, we don't know as yet, what to say about a will toward perfection). All these principles are based on comparative and experimental study of animals and plants, but not on a study of children.

The processes may be put in the following familiar schematic form.

- These five or six principles are based primarily on study of animal life and biological philosophy.
- a. Use and misuse of certain organs. (Lamarckism).
 - b. Heredity (Lamarck — Weissmann and Galton).
 - c. Survival of the fittest.
 - d. Natural selection.
 - e. Struggle for life.
 - f. Mutual aid ("consciousness" being a new factor in evolution): Kropotkin.
- } Darwinism.

Spencer seems to be almost alone in this movement. Those who follow developmental pedagogy are more exact, specific and clear in their conception of education than Herbert Spencer. I have in mind here the great American educators: President G. Stanley Hall, James Mark Baldwin, A. F. Chamberlain, C. H. Judd, and many of their followers. Baldwin is a follower of Spencer, while Hall and others proclaim the theories of Haeckel,—theories of recapitulation. Of course, the recapitulation theory as applied to education is—as they say—still in its infancy. I do not mean here the extravagant theories based on the misuse of the biogenetic law (psychogenetic law of Ziller and the Herbartians fancifully applied to "historical" instruction). A child recapitulates its philogeny. Yes, but how much does it recapitulate? The child makes some short cuts in his recapitulation? Yes, but how many of them does it make? Much will come without teaching. Yes, but just how much? Something will be done by instruction and elucidation. Again, how much? Will a child begin to walk sooner because he first crawls? Will he make greater progress if he starts his schooling at three instead of at five years of age?¹ All these questions must be answered, not by mere guessing, but by painstaking, scientific pedagogical investigations. President G. Stanley Hall has taught how to labor and to wait. Just now the scientific data regarding these questions are very meager. Many theories have to be tested. And much experimental work has to be verified in the field of education. Many pedagogical experiments have been performed, but their verification is still forthcoming. Thus the questionnaire methods of Galton and DeCandolle in regard to heredity are too crude to be accepted by modern scientific pedagogical eugenics. Thorndike is right when he says that in pedagogy a good deal is said, but nothing is proved. We expect much from Stern's psychography, Meu-

¹Winch: A modern basis for educational theories (Mind, Vol. 18, 1909).

mann's experimental school pedagogy, and Hall's comparative study of children. So far these are the only three hopes for modern pedagogy. The first laboratory to study human beings was founded in Russia (1908). A child by the name of Seryoga Parinkin is the first subject of study in this institution under the direction of Bechterew.

The historical and scientific conceptions of education, if taken separately, prove to be one-sided. It cannot be denied, however, that each movement has contributed something to the general uplifting of pedagogy. Perhaps we would sooner reach our goal if we should attempt some compromise between the various movements. Let us try!

IV²

To get a complete idea of the nature of education, we have to take into account, at least the following four considerations:

I. EVOLUTIONARY CONSIDERATION OF EDUCATION

1. Individual variation and adaptation to natural conditions of life are the basis and the most general assumption of all education. "Education is variation." An educator must know that education is not planned variation. Variation begins with nature, but education tends toward equalization, or the suppression of variation.

"Education is adaptation." We try to adapt the growing generation to present conditions. Education should not be adaptation to present conditions only. We should not only strive for adaptation to present conditions, but to so fit the child that he will consciously strive to better present conditions. We are not only growing beings, but we are growing beings who consciously strive for the attainment of certain ideals.

In short: considering the natural development, and deducing therefrom all the evolutionary facts, we may adopt a natural basis for education.

2. If we compare the processes of conscious education with natural development, we see at once, that education is something more than development or perfection. In all forms of organic life there is evidence of a strife for development and perfection. But this strife is not guided below man by any consciousness of the end to be attained. Only in man is this conscious and voluntary strife for the realization of an ideal of perfection manifested. Education is, therefore, an organized effort in natural development to induce the child to strive after an ideal of perfection. *In short: education, unlike natural development, is a conscious effort toward the realization of human educational ideals.*

3. In addition to this last partial definition of education, we must add the element of compulsion. To realize the conscious educational ideal natural development alone is not enough. In the training of domestic animals, and in the training of athletes, we notice the forcing of the natural powers beyond their natural development. So in the realization of the educational ideal, man must strain his powers beyond their merely natural evolution. In short: *in contrast to the natural course, education has a strong element of compulsion, a force toward a higher plane of development.*

4. But this is not sufficient. Education must transform this outer compelling force to an inner impelling desire for the attainment of the educational ideal. This is the only guarantee that the individual will continue his education after his period of schooling is over. In short, then: *in contrast to mere natural development, education is the conscious and persistent and impelling effort toward the realization of the human ideal.*

Next to the evolutionary consideration of education is the:

II. SOCIOLOGICAL CONSIDERATION OF EDUCATION

1. Education is transmission or tradition. Every generation takes an interest in its cultural wealth, customs, manners, social ideals, political and religious beliefs, and virtues. This is shown by the transmission of traditions from one generation to the other. It may be called the "occult coadjutors."

2. Education is the introduction of the individual into society. More particularly, education is the introduction of the individual to the moral atmosphere of the community; the adaptation of the individual will to the will of society; the training of all impulses and will directions according to the standards of the social or communal life — especially the development of sympathy, altruistic activities, and a sense of common interests, etc., familiarity with the prevailing habits and customs; familiarity with and performance of the duties of family, state, nation and finally philanthropic duties. To summarize: *Considering the different classes of human society, education is partly the building up of the moral sense, and partly the acquiring of the traditions and cultural wealth of former generations.*

Besides the evolutionary and sociological considerations of education we must now consider:

III. INDIVIDUAL-PSYCHOLOGICAL CONSIDERATION OF EDUCATION

According to this conception or consideration, education is the cultivation and development of the individuality of

the child and perfecting his mental abilities and dispositions according to the periodicity and peculiarity of his being. We must never forget the fact that each individual is *sui generis* in periodicity. Education must consider the child, not as an adult, but from the point of view of child psychology and experimental pedagogy.

In education, we have to deal with the child's intellectual, volitional and emotional abilities. These abilities are essentially developed by exercise and habituation. Our present methods of education are characterized by a certain unintentional harshness. This is because our school system (based on all but pedagogical principles) is not in a position to form a clear and precise idea of the state of the pupil's mind, of his wants, of his thoughts and feelings and of his *abilities*.

Intellectual education includes the acquisition of knowledge and skill. From the individual-psychological point of view, education consists of the practicing and habituation of volitional action and mental abilities, cultivation of emotional reactions, and communication of knowledge and skill. The success of this kind of work will depend upon our ability to enter into the pupil's innermost heart, and to look at things through his eyes. In other words: *from the individual-psychological point of view, education is partly communication of knowledge and skill, and partly cultivation of the mental abilities* — intellectual, emotional and volitional.

But education cannot be regarded merely as a training of the mind and of the moral nature. It must stand for the development of power and function in the organism as a whole. We must, therefore consider, lastly:

IV. PHYSIOLOGICAL-HYGIENIC CONSIDERATION OF EDUCATION

Under this heading we include:

1. The development of all physical powers upon which depends the development of mental abilities, especially the development of the senses and motor abilities.

2. The care of bodily powers and health, including everything under the term "Dietetics" ("School Hygiene").

In short: *from the physiological-hygienic point of view, education consists in teaching the child the proper use and care of his body.*

"Nothing new under the sun!" . . . But nevertheless, the sun is placed in a new position in the heavens from which it casts at least a ray of light from a new angle on this large subject.

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A BASIC EDUCATIONAL DELUSION

By HARRY LYMAN KOOPMAN, Librarian, Brown University

The sage Artemus Ward tells us gravely how he made large money by exhibiting the solar eclipse of 1860 through an open-topped tent. Had he been indulging in a covert prophetic satire on the mental attitude of present-day educators, he could hardly have hit upon a more apposite illustration. In the eyes of our schoolmasters the vast, overarching sky of knowledge can be seen only from within the walls of their open-topped tent. The world is willing to admit that they may have conveniences not ready to hand outside—smoked glass through which to observe the eclipse, and telescopes for viewing stars and planets and comets. But the world is still stubbornly skeptical whether these appliances are or may be furnished only within those narrow bounds; and it even ventures to question whether he whom fate has excluded from the sacred enclosure may not as he runs read much of what is most worth knowing in the heavens above him. Or, dropping the figure, it persists in asking the question: Are our educators justified in the tacit assumption that people cannot know anything of the world of literature, art, and science unless they have learned it in youth within the walls of a school?

Such a question virtually answers itself; yet the emphatic negative which it raises in the reader's mind is belied in every school curriculum and openly defied in the burden of miscellaneous studies that is piled upon the back of every school child. The framers of our curricula appear never to have asked themselves the two fundamental questions: What must the school give if the world is to have it at all? What can the school further give with advantage to society? The answer to the first question, if that is put absolutely, is: Nothing. If it is put relatively: A certain few things. The answer to the second question is: Much, but not necessarily much for each child and by no means the same things for all children. In other words, if our schools were all to be closed, more people than now would remain in ignorance, but most people would find themselves at middle life knowing as much as they do now. For it must be borne in mind that

the school is but a small part—not the initial part and not the final part—of any man's education.

What is it then that the school really does? Its first and most important function, from the kindergarten to the university, is to stand *in loco domi*, to offer a place where we can bestow our children until they are ready to launch out into life for themselves. Character-moulding, nurture, is therefore the first and most important function of the school. Its second function is to see that the child does not fail to acquire certain intellectual rudiments which are necessary stepping-stones to further knowledge; and these are substantially only the three familiar subjects of reading, writing, and arithmetic. These indeed may be and often are learned out of school; and as for other subjects, there is no individual one in regard to which formal education is indispensable. Geography is usually learned in school; but the school is after all a rather poor place in which to learn it. One certainly does not need to go to school to learn history. Indeed, it is probable that those among us who know history vitally owe their attainment to other sources than the school. The same is true of science and language. School is a distinctly poor place in which to learn foreign languages and even the use of one's own language, or to gain an appreciation of literature. The methods natural, or perhaps available, in school seem indeed particularly futile when applied to language and literature. These are sweeping statements; but do those people of middle age who are eminent for mastery in any of these fields owe their attainments to the schools or to other influences, if not most of all to native capacity and tastes?

If these postulates and their implications are admitted, what happens to the school? For one thing, an immense burden of responsibility is rolled off its shoulders. The school need no longer charge itself, at least directly, with the entire intellectual furnishing of the adult. It need no longer say to itself: If the men and women of the future are ever to know short-hand or botany or oriental history or algebra, it must be through me. It can with an easier conscience apply itself to its parental task of moral training, it can see that the pupil is furnished with the groundwork, the tools, of future study, and it can make other subjects the means of opening up to the developing mind the vision of the universe of knowledge that surrounds it. It will add to the vision the enthusiasm for learning which belongs to it, but which the school of to-day, even when it allows a glimpse of the vision, so often omits or actually destroys.

The truth is, children begin to learn before they go to school and men and women keep on learning after they have left it.

They cannot help learning. The school can do much to determine what the adult shall learn, and here is its opportunity. It can implant in the pupil a hunger and thirst after knowledge that he never can sate. It can do a hundred things well for various pupils where it now does twenty-five badly for all. In modern life school is a necessity, but not first of all an intellectual necessity. Yet, having the pupil in its control, it is clearly under an obligation to see that he acquires certain fundamental elements of information. These elements will be the same for all, at least for all of the same sex. After this the school and the pupils have room for choice, and the choice will not always be determined by what is easiest or most agreeable; it may often be made on disciplinary grounds. But it can be made individual, and it can be absolutely free from the pressure which is born of the present mistaken sense of responsibility for the pupil's entire intellectual outfit. That sense of responsibility harks back to a time when there was a rational justification for it, when schools were fountain-heads of knowledge as well as of training, but that was before Gutenberg's day, and they seem to overlook the fact that we are now living in the fifth century of printing. The world surrounds the pupil not only with the knowledge that comes from direct observation and experience, but also with the vaster knowledge, recorded, systematized, and interpreted, which is stored in our libraries and thrust upon him in magazines and newspapers. Let the schools teach first, last, and midst the mastery of these sources of knowledge, and their own part in the training of humanity will become vastly more efficient, and if not correspondingly easier, at least vastly less burdensome both to themselves and to the children whom we entrust to them.

KNOWING AND EXPRESSING ¹

By R. M. OGDEN, PH. D., University of Tennessee

There is a belief, which I fancy to be rather wide spread among teachers, that a pupil knows only what he is able to express. After putting a question to a pupil, a not infrequent response is: 'I know it, but I can't just tell it.' It is evidently difficult to place an estimate on the knowledge which such a pupil may believe he possesses, and the common practice would probably be to accord that pupil a zero on his recitation.

But there is something more than this bit of practice which I have in mind. The problem must arise: does the pupil possess the knowledge which he believes he does, or is it correct to assume that if he really had the knowledge, he would also have the capacity to express it? In the former case, the pupil's deficiency is clearly in his capacity of expression, in the latter, it is the content of knowledge that is lacking.

Now this is not a mere academic question, as it might seem to be at first view, in the light of the general assumption that knowledge which a person may possess but cannot express, is clearly useless. The answer to the question involves, rather, the whole trend of the educative process as applied to that pupil. For it is clear that a teacher may instruct with a minimum of emphasis upon the pupil's expression, as is the case in the lecture method, or whenever the teacher does the greater part of the talking in class. On the other hand, he may instruct with a method which stresses the responses of his pupils, be they oral, written or manually constructed.

There exists at the present time, if I am not mistaken, a somewhat widely spread pedagogical doctrine that knowing *is* expressing; that there is no definite bifurcation of the two processes. And modern psychology, at least in so far as the general trend of American psychology is concerned, has lent its assent to this doctrine. The conclusion is arrived at in a most direct fashion, and at first sight it is quite convincing.

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It has long been the contention of the 'structuralist,' or analytical psychologist, that consciousness is made up of three sorts of elements, and only three: sensations, images, and feelings. All that we may perceive, and all that we may think, when subjected to careful analysis breaks down into elements of these three sorts. The 'functionalist' in his turn has risen to do justice to the active side of conscious life, and, as a result of genetic and physiological considerations, has reached the no less definite conclusion that all states of consciousness issue directly or indirectly in bodily adjustments.

Since, then, our knowledge of a thing consists in sensations, images, and feelings of it, and these all issue in corresponding movements, is it not logical to assume that the movements of adjustment which result should be adequate to their conscious motives, *i. e.*, to the sensations, images, and feelings which have preceded? Indeed, the 'functionalist' regards the relation of conscious motive and attendant reaction as unified to such a degree that he goes even further, and declares that the act of thought is incomplete as a matter of consciousness alone, and attains its completeness only with the attendant reaction.

Now I find no particular flaws in these conclusions, provided the premises are acceptable. But especially with respect to the 'structuralist's' contention, I must take issue.

Recent experimentation, mainly in Germany, in some of which I was privileged to take part, coupled with a considerable amount of similar investigation which I have since been directing in my own laboratory, has forced me to the conclusion that the 'structuralist' is wrong in his contention that sensation, image, and feeling are a sufficient number of categories under which to collect and distribute the complex facts of experience. I maintain, as has been maintained by Külpe, Bühler, Bovet, Binet, Woodworth and others, that there is an imageless mental content which possesses the characteristics of *knowing*, rather than those of feeling; which is concrete and definite as to content, and yet bears no striking resemblance to the sensations which are generally agreed to be the source of our experience.

If a person thinks only in images: pictures, sounds, words and muscular factors, one can see no reason why he should not be able to express with some degree of accuracy those images of which he is conscious when the thought forms in his mind, and one may contend with a fair degree of consistency that an adequate expression is a necessary consequence of such imaging. But if one denounce this all-pervading presence of the image as primarily false, and even were it

true, as insufficient to describe the actual state of mind when one thinks; and if one declare for a class of mental factors which are neither colored, nor sounding, nor motory in content, but may, perhaps, be expressed indifferently in these or those words, in this or that picture, then it is no longer so evident that an adequate expression is invariably coupled with our conscious thought.

It is impossible within the brief limits of this paper to give any detailed review of the experimental results obtained by myself and by others in substantiation of these imageless contents. I propose, however, to describe and analyze one experiment taken more or less at random from many of a similar nature which I have performed, in order that I may make somewhat more clear the need for positing this imageless thought content.

The experiment in question consisted in instructing the subject to obtain the meaning of a word, and then to react with a pre-determined oral expression, an explosive sound against a 'speech key' which was electrically connected with a chronoscope and thus registered the termination of the experiment. The word in this case was 'lily' and was printed on a card which was exposed to the subject by an apparatus especially contrived for such purposes. The subject reacted in approximately 1.3'', and his introspection was as follows:

'I noted the spelling at the first glance. The meaning, that of a flower, came immediately, There was also a notion that there should be two ls, which caused me to glance at the word again, when I saw that there was but one. I became conscious then that *lily* was a girl's name, then, after a little time, that the girl's name was spelled with two ls. The word seemed to give a peculiar impression as rather delicate and pretty.

'There were no images present.'

This is a fairly typical experience from among the many which I have obtained in working for more than a year with some ten different persons. First comes the meaning which simply flashes forth without verbal, visual or other imagery. Second, there is the thought that there should be two ls, causing the subject to look again at the word and check the spelling. But this thought does not bear its full meaning, there occurs a third thought that *lily* is a girl's name, and then, finally, 'after a little time' the meaning is completed by the thought that the girl's name is spelled with two ls.

For the purpose of testing the actual content of this experience, let us consider certain possibilities of interpretation

which are made much of by those who oppose the existence of imageless thought:

I. The part played by *kinesthesia*, or motor factors in thought.

II. The possibilities of condensed imagery of various types.

III. The theory that thought is essentially unconscious.

IV. The part played by imageless relational factors.

I. Many contend that thought is carried on to a large degree by motor sensations and images which, though very fundamental to our conscious lives, are rather elusive when introspection is focussed upon them. The question here is, may we consider certain movements, tendencies to movement or images of movement on the part of eyes, throat, tongue, lips, hands or body as being adequate to the thoughts which our experiment has registered. In the first place, what conceivable movement could be adequate as a vehicle for the general meaning of flower? Second, note that the 'notion that there should be two ls' is *followed* by a glance back at the word to see if there are two. But suppose that the introspection here is fallacious; that the real occurrence was something like this: some peculiarity in the perception of the word occasioned an uncertainty in the motor adjustment, whereupon there followed an automatic return to the word for a second perception. The 'notion that there should be two ls' then becomes an afterthought. But is it, I ask, any less a thought which is essentially independent of motor factors?

Such a description, however, does real violence to the facts as recorded. The subject *knows* why he is returning to the word. He *knows* that he is back to find out if there are two ls or one. No motor adjustments or tendencies that I can conceive are adequate to stand as vehicles for this knowledge.

The thought that 'lily' may be a girl's name is an entirely unique factor, a new meaning, and irreducible to any motor adjustment save, possibly, such as would be involved in articulating the words 'girl's name.' That any such imagery was present is denied by the subject. As to the reliability of his assertion, I can simply say that I have been working with him for considerably more than a year, in which time I have performed hundreds of experiments of this nature with him. Not only do I regard his introspections as unusually unprejudiced and accurate, but, which is far more important in such matters, the internal evidence gained by a comparative study of many such reports indicates the distinctive character of verbal imagery when it does appear, and therefore the reliability of the practiced observer in indicating whether such factors are, or are not present.

The last thought which connects together in an associative synthesis the 'notion of the two ls' and the girl's name is equally remote from any motor vehicle. It indicates, too, a fact for which there is much evidence, but of which I can here take but a passing notice, namely, that the associative meanings are processes which work themselves out, sometimes rather slowly, and while in this process of development, their outcome may be quite unknown to us.

Kinesthesia, then, or the presence of motor factors, would hardly seem to be an adequate bearer for the thoughts here recorded.

II. We have next the contention that thought consists in condensations of imagery, which, as a result of practice, may have become so rudimentary as to be practically inscrutable. There is no doubt, I think, that imagery does with time undergo this process of disintegration and collapse. But how, I ask, can any set of images, complete or rudimentary, be conceived as adequate to the particular process of thought indicated in our experiment? It is conceivable, of course, that 'lily' should be responsible for the immediate associative reproduction of 'lilly,' and the latter image, in turn, associate some sort of verbal or visual image for *girl*, together with the motivation for a renewed glance at the original word. But this order of events is not the one recorded, nor is it the one which is characteristic of the mass of experiments which I have performed. A 'notion' brings about the checking of the spelling, and only later does the notion become explicit, first, by the thought of a girl's name, and second, as if in substantiation of this thought, by the added thought that a girl's name is spelled with a double l.

Did I not have the data for many similar experiences to support my interpretation, I might suppose that my subject mistook the order of his thoughts. But it is one of the most striking features of thought analysis, that the order of the partial thoughts is *not* that which one would have to posit in assuming that thought consists in the direct association of images. The integration of images, however rudimentary the images may be, is of a different kind from the process of thought here indicated. Instead of being the essential factors of thought, images would seem rather to be analogous to a trail of sparks which are cast off and follow in the wake of thought. Condensation of the images can, therefore, hardly be considered a satisfactory explanation for an experience which would not be explained by the same succession of images if they were complete.

III. A third contention has it that the process of thought is essentially unconscious, being based on habits of neural

action which work themselves out automatically, bringing to consciousness only as a final result the integrated image or expression which carries the meaning of what has been going on. I am quite agreed that such unconscious workings do exist, but the resultant consciousness of meaning is not invariably an image or the sensational complex produced by a motor expression. No images at all which could be adequate to the thoughts present in our experiment were noted, and the only motor adjustment was that involved in the renewed glance at the word to check its spelling. The only way, then, in which this contention could be here justified would be in the supposition that the subject did not know what he was experiencing until after his reaction, until, in fact, he had put it into the words of his introspective report. There is, perhaps, no better way of combatting such a view than by reference to one's own personal experience in such cases. The reports of my subjects, as well as those of myself in the many experiments in which I have served as observer, leave me with the complete conviction that the experience is, in fact, definitely ended with the reaction, and that the introspection is, indeed, a separate and distinct experience.

IV. Finally, there is the opinion of those who are willing to go so far beyond the accepted categories of sensation, image and feeling as may be necessary to introduce the consciousness of relation as an imageless reality. They have in mind an imageless consciousness of a process which operates to bring the images together into a synthesis. This is also a fact which need not be denied. But it does not reach far enough to give an adequate explanation of such an experience as is here described. A relation must involve at least two factors which are being related. In our experiment the necessary factors, such as the word and the flower, the spelling with one l and with two ls, the word with the girl's name and the girl's name with the two l spelling, were certainly not present as images, if we are to believe our reporter, though they must have been present as thoughts. We may therefore conclude, I think, that however important these imageless relational factors may be for thought, they by no means furnish us with the complete explanation which some writers claim for them.

Take the results of such an experiment as this in any way one will, and however one may choose to interpret them, the assumption of imageless contents as a fourth category of mental states appears to me to be absolutely necessary if one would do full justice to the process of thought. To avoid this issue means, I believe, to remain in ignorance of the real subtleties of the thinking mind.

I have said enough, however, to indicate the problems involved in these investigations, and the conclusions which are to be drawn from them. I therefore return to my thesis that knowing is not identical with expressing, if by expressing we mean a relatively adequate interpretation of that which is known. Knowing is rather a process which is distinct from the process of expression, and expression, in its turn, has its own peculiarities of origin and growth. Indeed there are many who possess a facility of expression quite beyond the demands of their feeble knowledge, while others, though deep and effective thinkers, are condemned to struggle constantly with their deficiencies in expressive art.

In conclusion, let me say that I am not advocating the employment of measures any less strict in enforcing accurate and adequate expression on the part of our pupils. Quite the contrary, for my own experience as a teacher has led me to conclude that the greatest general need which my pupils show is their inability to express themselves clearly. But this very thing has led me on to the thought that possibly a reason for this general inability to make themselves clear is found in the fact that their training has been largely of the content-memory type, a type in which the expression has been left to take care of itself. What we need is much greater stress upon the expression side of education, and more latitude for the individuality of our pupils. A broader training in linguistic expression, oral and written, would, I believe, help greatly to relieve the very evident congestion of thought and words apparent whenever one strikes the average pupil on a point outside the range of his text-book discussion.

The doctrine that thinking is expressing, in so far as it culminates in the belief that a person can only express adequately what he has definitely imaged or committed to memory, is, in my opinion, a really pernicious doctrine. We should, as teachers, be constantly on guard against the repetition either of our own words, or of the words of the text-book. However true it may be as a literary ideal, we must overcome the notion that only one expression is supremely adequate to a thought, in order that we may give a more considerate attention to those who know but cannot express.

ARITHMETIC AND SCHOOL HYGIENE

By WM. H. BURNHAM, PH. D., Clark University

Modern school hygiene is far-reaching in its demands. It maintains that not only the content of education, but all the processes of learning and of instruction should be considered in relation to the health of the pupils. It challenges every subject of instruction and every principle and method in education. Arithmetic with its high and honorable place in the curriculum is no exception.

First of all hygiene joins with pedagogy in asking why so much time is devoted to this subject in the traditional curriculum and what are the results of the instruction.

An extensive study of the results of arithmetical instruction in our schools was made some years ago by Mr. Rice (24). Recently the same subject has been investigated with improved methods by Mr. Stone (27). The result of both investigations is to indicate that the pedagogical outcome of the instruction is not a function of the time devoted to the subject. The investigators often found as good results in those schools where a relatively small amount of time was spent in arithmetic as in those where the largest proportion of time was allotted to it. Mr. Stone found his best results in a school where only 14% of the time was devoted to the subject, although it is true he found his poorest result in a school where 12% of the time was devoted to it; but in other schools where from 16 to 20% of the time was spent in arithmetic the results were not as good as in some of those where less time was spent.

If in 16% of the school time pupils learn as much arithmetic as in 20% of the time, hygiene suggests that the superfluous time devoted to the subject had better be spent in play out of doors. It is not for hygiene to minimize the importance of arithmetic; but with so many subjects crowding the curriculum the question whether too much time is not spent on it, although primarily a pedagogical question, becomes an hygienic one also.

Before considering the results of the work in arithmetic, let us glance for a moment at the history of the subject, and the reasons that have given it such a large place in the common school curriculum.

First of all we find that a certain superstition has been connected with it in the history of thought. In the early times number and number relations seem to have had often a mystic and even sacred significance. Pythagoras found the key of the universe in number and proportion. For many since Pythagoras number has had a philosophical significance and consequently a great fascination. In the Middle Ages a religious significance was attached to arithmetic. For a single illustration, in one of the old books the following dialogue occurs:

"What does the number 7 remind you of?"

"The 7 deadly sins, the 7 sacraments, and the 7 golden candle-sticks."

"What have you to tell me about the number 12?"

"The number of the apostles, the number of the minor prophets, and of the gates of the Apocalyptic Jerusalem." (10, p. 280.)

A religious lesson, however remote, could always be correlated with that in arithmetic. Suevus tells the story of Jonah to introduce problems in regard to the freight of merchant-vessels and the like. Another of the older mathematicians connects a problem in statistics with the story of David's sin in numbering the Israelites. A certain William Butler (31), who prepared, about the close of the 18th century, "Arithmetical Questions. . . . Designed for the use of Young Ladies," showed his ingenuity in correlating things sacred and profane by a problem like this: "To as many guineas as the Israelites wandered years in the desert add as many half-crowns as there are provinces in Spain."

An example of the not over modest claims made by some educators for the study of arithmetic is furnished by William Kempe (15) in the dedication to his translation of *The Art of Arithmetick* by Ramus. "In his dedication Kempe asks who is there that can attain to a knowledge of his art, whatever it is, without arithmetic. It is useful in divinity, in civil polity, and 'in the seat of judgment the golden rule of proportion is the law of equity.' In physics, in astronomy it is clearly necessary."

"What is music," he goes on, "in sounds, in harmony and in their spaces, concords, and diverse sorts, but only arithmetic in hearing? Take away arithmetic, ye take away the merchant's eye, whereby he seeth his direction in buying and selling; ye take away the goldsmith's discretion, whereby he mixeth his metals in due quantities; ye take away the captain's dexteritie, whereby he embattaileth his army into convenient order; finally ye take from all sorts of men, the faculty of executing their functions aright. Arithmetic then teacheth

unto us matters in divinity, judgeth civil causes uprightly, cureth diseases, searcheth out the nature of things created, singeth sweetly, buyeth, selleth, maketh accompts, weigheth metals and worketh them, skirmisheth with the enemy, goeth on warfare, and setteth her hand almost to every good work, so profitable is she to mankind."

Jänicke (14) suggests also, that the reason for the undue attention to arithmetic in the old schools was the laziness of the teachers. It was comparatively easy to fill up the time of instruction by giving the pupils long and difficult sums.

It is true that with the later development of the classics arithmetic lost its prestige and had an inferior place in school work. But with the development of modern commerce and industry the value of arithmetic has loomed large again and the view has been wide spread in this country that this practical importance of the subject makes it necessary that a large amount of time should be allotted to it in the curriculum.

Another reason for the great amount of time and energy devoted to instruction in arithmetic has been the idea that mathematics is especially valuable for formal training. According to many educators no other subject can give such excellent mental discipline.

These are among the reasons why a great deal of useless matter has been introduced into the text-books; and that it has come to pass that, in the opinion of many, the sooner children can be taught this subject the better. Sometimes, however, even in the older days a voice was raised in protest.

"That mathematics," says Sir William Hamilton (11), "can possibly in their study educate to any active exercise of the powers of observation, either as reflected upon ourselves or as directed on the affairs of life, and the phenomena of nature, will not, we presume, be maintained." "That they do not cultivate the capacity of generalization," he continues, "is equally apparent." "But the study of mathematical demonstration is mainly recommended as a practice of reasoning in general, and it is precisely as such a practice that its inutility is perhaps the greatest." Mathematical demonstration calls forth a minimum of thought. "Are mathematics then," he concludes, "of no value as an instrument of mental culture? . . . To this we answer, that their study, if pursued in moderation, and efficiently counteracted, may be beneficial in the correction of a certain vice, and in the formation of its corresponding virtue. The vice is the habit of mental distraction; the virtue, the habit of continuous attention. This is the single benefit to which the study of mathematics can justly pretend, in the cultivation of the mind; and it is the only one accorded to it by the most intelligent philosophers."

In this country perhaps something of the old superstition has survived, and also the tremendous importance of arithmetic for success in this life has been emphasized. In the older schools in the rural districts the boys often spent most of their time in ciphering. The feeling of the rural communities in regard to arithmetic is hardly put too strongly by Eugene Wood in one of his essays in "Back Home."

"Reading, writing, and arithmetic,—these three; and the greatest of these is arithmetic. Over against it stands grammar, which may be said to be derived from reading and writing. Show me a man that, as a boy at school, excelled in arithmetic and I will show you a useful citizen, a boss in his own business, a leader of men; show me the boy that preferred grammar, that read expressively, that wrote a beautiful hand, and I will show you a dreamer and a sentimentalist—a man that works for other people. While I have breath in me, I will maintain the supereminence of arithmetic. There is no room for disputation in arithmetic, no exceptions to the rule. Twice two is four, and that's all there is about it; but whether there be pronunciations, they shall cease; whether there be rules of grammar, they shall vanish away. . . . Arithmetic alone is founded on a rock.* All else is fleeting, all else is futile, chaotic—a waste of time."

This exaggerated esteem of arithmetic has decreased in recent years; but probably a fifth of the time is still devoted to the subject in most of the grade schools. What has been the result of all this attention given to arithmetic? From a pedagogical point of view the results seem to have been unsatisfactory as indicated by the investigations of Mr. Stone (27) and others. From a hygienic point of view some of the results have been unfortunate.

While some persons have great natural ability in mathematics and are fond of its processes and its puzzles, on the other hand to many children the subject is a peculiarly difficult one. The case of Dean Stanley and other distinguished men who never could make much of mathematics are enough to show that such people are not always dullards. In the case of some children, as pointed out by General Walker (30) and others, work in arithmetic is a general source of worry, interferes with sleep, the pupils doing sums or the like in their dreams, and is liable to be a serious menace to health. If taught prematurely or by a bad method it may cause or aggravate nervous disorder.

Dr. Sturges, of London (28), studied a great many cases of chorea in children. In 1885 he reported upon 200 cases. A cause could be assigned in 75 cases. Of these 14 were, in his opinion, due to causes connected with the school, nearly

one sixth of them; and for chorea in general the school is responsible for at least one fourth of the cases. Work in arithmetic he deems a special factor in producing the disorder. He thinks that working sums is very liable in a nervous child to cause chorea. Anything in fact that so bothers a child that the mere mention of it makes the child cry is dangerous. The following case that he cites is instructive.

"The patient was a girl, aged nine, healthy and ruddy but of excitable temperament, is stated by her mother to have been troubled and sleepless owing to school lessons, and especially school sums. . . . As evidence of her capacity the child worked a sum in long division before us sitting up in bed. . . . The method employed was this. The left arm is clutched around the slate, the fingers being hooked to its right upper corner and it is maintained in writing position by being pressed against the pit of the stomach. Face, lips, and tongue concur with the right hand in the work to be done. The slate pencil is held low, and, the tip of the forefinger being always moist, figures in the immediate vicinity of writing operations are in danger of getting accidentally rubbed out. At the slightest suggestion of error, the work is suspended, the finger rewetted, and the doubted number rubbed out. From the frequency of such erasures and the mode of effecting them, the working surface of the slate becomes wet and sticky. In the bad places, indeed, owing to repeated correction, there is a confused mixture of saliva and pencil mark which can no more be written upon than a coat of varnish. The seriousness and persistence with which the child encounters all these difficulties, the conscientious completion of each figure and prompt wetting of the finger to score it out, the cheerfulness and alacrity displayed when the time comes for some formal and obvious act, such as drawing lines and affixing crosses, the way in which severity of mental conflict is shown by a tighter grasp upon the slate and increased pressure upon the stomach—all this makes a picture which to the initiated is half comical and half touching."

In the English schools it appears that it has been a common practice for pupils to stand in a line and work sums in concert at a uniform rate. Of his patient Dr. Sturges adds: "Suppose her standing in class, with heels together ciphering. Is there any kind of work that can be thought of so admirably contrived to develop the complaint we are considering?"

The significance of such symptoms may escape the untrained observer; but anything which indicates anxiety and worry, mental strain and nervous tension in connection with a child's school work is serious from the point of view of hygiene; and in the case of a disease like chorea it is specially

important that the symptoms indicating it should be recognized so that the disorder may be properly treated while it is in its incipient or school stage. Injury is liable to be done such children not only by the class instruction, especially where drill in concert is given, but also by any harsh or sarcastic words by the teacher. The pathetic tragedies in childhood that occur in individual cases of this sort emphasize the warnings of hygiene more than is possible by means of statistics. A single case is the following:

A boy of ten is working a sum on the blackboard. He stumbles and blunders unaccountably. The teacher in her pedagogical zeal goads and nags him, and finally humiliates the boy by bringing into the class his younger sister from a lower grade to perform the example for him. Within ten days the same boy is ill with endocarditis, a disease to which chorea too often seems to be prodromal.

Hygiene first of all, of course, condemns all such obvious means of injury to health. It is concerned also with the more common but less apparent evils liable to occur. As pointed out by Dr. Baade (1), there are certain secondary effects of instruction, certain by products, to use the language of industry, which are often of great importance. Pedagogy has given special attention to the primary effects of instruction. Hygiene emphasizes the importance of these secondary effects. In arithmetic we have a good opportunity to study these. Perhaps the most obvious are the mental automatisms that result from the premature or undue use of certain methods and devices. Dr. Triplett (29) has studied these by means of the reminiscences of normal school students. Among the cases reported are the following:

One girl who was taught to add and subtract by the aid of an abacus says: "for several years it was impossible for me to get away from those red and green balls, and to this day I scarcely add a column without recalling them unconsciously."

"Another learned the digits by fitting together sliced birds and now always sees them in the old connection. Some write at one side the figure to be carried or make the corresponding number of marks. The "borrow and pay back" method of subtraction often persists through the years. One student in adding counts on to the number the prongs of the 3 or 4. When paying close attention to a subject another finds herself running up the scale of number by twos, threes, or tens. Another writes 1234 continually. Another writes dollar signs by the hundreds. Instead of the different digits some visualize corresponding groups of dots. One says: "I always see the picture of the number on my finger. When

recalling a number, as 352 for example, I see the first three fingers then the whole hand and then the first two." Some see the problem being worked out on a mental blackboard. Others note the set of mind given them by years of working for the answer, also the effect of using a rule not understood. Students who learned the multiplication table in concert report being compelled to start at the beginning and go to the combination desired.

The apperceptive bent given the mental reactions by continued drill in a subject is well illustrated in the case of a six-year-old child reported by Triplett, who was being pushed in his number work by a teacher desiring his promotion. "Mamma," he remarked one day, "I am getting so that when I ride or walk in the street I see the combinations in the windows of the houses we pass." Another time seeing the velvet trimmings on a little girl's clothes he exclaimed "Myrtle has combinations of five on her cloak."

The number forms common among children seem often to be the secondary effects of certain devices and methods employed in the early years. Triplett is right, perhaps, in calling many of these peculiarities arrests of development.

The most serious form of number arrests, in Dr. Triplett's opinion, is "the counting habit, called arithmomania, when so pronounced as to become pathological. Classification of cases showed forty of these of varying intensity. Later inquiry, however, revealed the fact that several counters are likely to be found in every large class. The trait really seems to be a misfortune, impeding or hindering progress in other directions; numerical relations and quantitative ideas fill the mind to the exclusion of things causal and qualitative." The following cases will serve as illustration:

"From my mathematical training I am under a constant nervous strain in my desire to enumerate everything I see. In our school more attention was given to arithmetic than to any other study. We almost thought in numbers, and ever since then I have had a desire to count telegraph poles, the boards in the sidewalk, and the trees along the way."

"I have a habit of counting by the alternate contraction and relaxation of the muscles of my legs and arms. I often count my steps when I walk and spell words to myself as I alternately contract and relax the muscles as before mentioned. I have counted that row of electric lights on the arch over the front of the stage in the assembly room hundreds of times and also the plaster of paris panels of which each circle of the arch is composed."

"I do not remember of ever knowing anything of combinations. To find out, for instance, what two and three were I

always had to count, until I learned it by myself. This arrest has been partly overcome by my high-school work and also by my own teaching, but I often find it creeping into my work especially if I am tired, to confuse and retard me."

Why, it may be asked, are such automatisms injurious? They seem to be innocent and most people have something of the sort in their mental experience. The answer is that they represent at least so much useless material, that the maturing mind has to carry the crutches by which it first learned to walk, or dropping the figure, that they represent unessential mental processes and in many cases prevent orderly, straightforward thinking by causing interference of association or mental confusion. Again in some cases they seem to be the germs of pathological neuroses, and it is noteworthy that these habits persist, and even when they seem to be outgrown the individual is always liable to drop back into them, especially when fatigued or confused. Although partially overcome and repressed they may represent the foci from which in times of mental stress pathological activities are liable to develop.

Again the teacher is apt to desire above all things speed and accuracy in arithmetical work. Hygiene notes the secondary results of the drill in speed and accuracy. These results sometimes seem to be seriously unfortunate. The following concrete illustration is instructive:

"I remember," writes a teacher (4, p. 219), "a primary class that was once brought into a meeting of the teachers of a certain Wisconsin city. The superintendent's purpose was to illustrate the wonderful perfection in 'speed and accuracy' to which the teacher had brought her class. Long examples in addition were dictated to the children, written on the blackboard, and computed. There was one boy who attracted particular attention. He showed the high pitch of strain to which he was raised by not being still a moment—a sort of jig being performed while the process of reckoning was going on. He usually came out ahead of the others and excelled in accuracy. I was a high school teacher long enough there to have this boy come into my classes for his higher mathematics. I found him incapable of thinking in those subjects. My subsequent reading of child study investigations leads me to believe that that boy was a striking illustration of arrested development, coming from over stimulation, and over training in one direction."

Hygiene always looks with grave suspicion upon such cases of arrested development. The attitude of sound pedagogy toward such embodiments of speed and accuracy was expressed by Oliver Wendell Holmes (3, p. 454) in his "Autocrat

of the Breakfast Table." Commenting on Babbage's calculating machine he wrote: "What a satire, by the way, is that machine on the mere mathematician! A Frankenstein monster, a thing without brains and without heart, too stupid to make a blunder; that turns out results like a corn-sheller, and never grows any wiser or better, though it grind a thousand bushels of them." Here is speed and accuracy!

Other obvious secondary effects of instruction in arithmetic have not been especially investigated. We get some suggestion in regard to them, however, in the errors made by pupils. A teacher reports, for example, that a common error in the higher grades is to confuse the square of a number with twice the number. The question arises whether perchance the long drill upon the various combinations of two in the elementary work may not have been the original cause of this error. Two times two equals four; two plus two equals four; The square of two is four.

In the simpler study of number and number relations, in addition, subtraction, and the rest, the process of learning is chiefly one of acquiring habitual associations. Hygiene demands that these shall be formed naturally and that interference of association or mental confusion shall be avoided. Some of the processes in case of the Grube method and the like may be challenged from this point of view.

Hygiene is especially concerned with the problem at what age a child should begin the study of arithmetic? Formal systematic instruction is probably begun too early in most schools. Prof. Patrick and others maintain that the subject should not be begun before the age of ten. The experience of many individuals and of teachers in some schools where arithmetic is not studied until this age indicates that such postponement is no loss but rather an advantage. It does no harm for a child to give attention to quantitative relations at an early age; but this should be incidental to other occupations. Formal instruction in the subject is what is liable to be injurious. This is what Prof. Patrick (21a, p. 389) had in mind when he said: "Mathematics in every form is a subject conspicuously ill fitted to the child mind. It deals not with real things, but with abstractions. When referred to concrete objects, it concerns not the objects themselves, but their relations to each other. It involves comparison, analysis, abstraction. It calls for a fuller development of the association tracts and fibres of the cerebral hemispheres. The grotesque "number forms" which so many children have, and which originate in this period, are evidence of the necessity which the child feels of giving some kind of bodily shape to these abstractions which he is compelled to study."

Much of arithmetic, even of elementary arithmetic, consists of lessons in logical thinking. This is well illustrated in a recent paper by Mr. M. A. Bailey (2) before the National Education Association. Take the following simple problem:

"If 1 apple costs 3 cents, how much will 5 apples cost? In terms of logic the solution is as follows:

Maj.: "The cost of 5 apples" is 5 times "the cost of 1 apple."

Min.: "The cost of 1 apple is "3 cents."

Con.: The cost of 5 apples is 5 times "3 cents."¹

In order to reason correctly it is necessary to consider the major premise, and also to correct this and what logicians sometimes call the guiding principle by constant reference to experience.

Mr. Bailey shows the evil effects of invariably neglecting the major premise and the guiding principle by two illustrations. "The first is a problem involving division in which the relation is indirect:

If 1 man requires 6 days for a piece of work, how many days will 2 men require?

Maj.: 2 men require $\frac{1}{2}$ as many days as 1 man.

Min.: 1 man requires 6 days.

Con.: 2 men require $\frac{1}{2}$ of 6 days.

"If the learner does not keep the major premise in mind, misled by the similarity of the problem to one involving multiplication, he will say: "'Since 1 man requires 6 days, 2 men will require 2 times 6 days.' If he retains the major premise he will reason correctly: 'Since 2 men require $\frac{1}{2}$ as many days as 1 man, 2 men require $\frac{1}{2}$ of 6 days.'"

(2, p. 385.)

The second illustration is a problem apparently involving multiplication, but really involving no one of the operations:

If a dog standing on 1 leg weigh 15 pounds, how much will he weigh when standing on four legs?

If old enough and mature enough the child will correct the erroneous principle here suggested by reference to experience

¹"The terminology here is open to criticism because this reasoning is not strictly in syllogistic form. What is termed the major premise is rather the guiding principle of this inference. This argument like most of our reasoning, even most of our mathematical reasoning, is not syllogistic. It proceeds, however, as Mr. C. S. Pierce has pointed out, according to certain guiding principles. The passage from the premise to the conclusion takes place according to a habit. 'Upon contemplating the believed premise, by a sort of perception the conclusion is judged to be true.'" The term major premise, however, may perhaps be used as Mr. Bailey does without serious confusion. See "On the Algebra of Logic," page 17. (22.)

and make the major premise as follows: a dog standing on four legs weighs the same as when standing on one leg.

This problem is relatively simple. The following, however, is likely to puzzle many children in the lower grades:

If three men fall nine feet how far does one man fall? A child who has had sufficient experience will at once note that each man falls the same distance and hence that here there is no problem. One who does not refer to experience will be likely to fall into the pit, and his error will hardly differ in kind from that of many an older thinker.

Matthew Arnold was perhaps one of those who have acquired the habit of ignoring experience, at least so far as arithmetical questions are concerned. The following story is told of him: "Entering the room of his colleague," he said, " 'You know, Roby, the old way of doing rule-of-three sums is quite exploded: the only way is the unity method.' Roby: 'Always happy to learn. I 'll just set you a sum, and you shall show me the method. If three men can mow a field in four days, how long will it take six men to do it?' Arnold: 'Ah hem, I 'll just take it to my room and come back.' Exit and rapid return. 'I say, Roby, no humbug, you know; it really is a sum?' " (18, p. 432.)

Plenty of illustrations of a more serious sort could be collected. The trouble with all the cranks, partisans, and fanatics is that they have a stock of persisting major premises and guiding principles which no amount of changing experience can alter. Whether or not this is injurious to their own health it is a source of mental disquietude to their companions.

Thus, as we have seen, in order that thinking may be sound it is necessary that one should give attention to the major premise and the guiding principle and also correct and control these by frequent reference to experience. This the child should be trained to do, and it is a serious question whether or not our prevailing methods do not tend sometimes to bring about a habit of artificial thinking according to the forms of logic without reference to experience. This is a habit always dangerous. Experience is the anchor both of wisdom and sanity.

Not only is much of the work in arithmetic really logic, but teachers usually love logic and hence by their methods they are wont to make many processes formal, logical, and complex, which nature has made simple. In the older forms of recitation this was especially true; and not merely waste of time but premature formalism and pedantry were liable to result. A single example must suffice for illustration.

Superintendent Greenwood of Kansas City reported some years ago a typical example of the logical recitation methods:

"Question:—If you have one thumb on your right hand and one thumb on your left hand, how many thumbs have you on both hands?"

Answer:—Since I have *one* thumb on my *right* hand and *one* thumb on my *left* hand, I have as many thumbs on my *right* hand and on my *left* hand as the sum of the thumbs on both hands. Therefore I have as many thumbs on my *right* hand and on my *left* hand as the sum of the thumbs on both hands, or two thumbs."

It is, as I gather from Mr. Stone's investigations, in the sort of logical analysis here grotesquely illustrated, that he finds much of the time devoted to arithmetic is wasted.

Dr. James used to say that it is not well for a man to philosophize on an empty stomach. It is equally true, perhaps, that it is unwise for a child to reason until it has a large and rich collection of concrete experience. This seems to be strongly suggested also by experimental studies by Meumann (20) and others, which indicate that children who think in abstract terms prematurely are below the average in intelligence.

Prof. Young (32, p. 17) in his excellent book on the teaching of mathematics expresses the belief that the chief value of the subject lies in the fact that "it exemplifies most typically, clearly and simply, certain modes of thought which are of the utmost importance to every one." One of these modes of thought, for example, is, as he explains, the ability to grasp the facts in a situation. Hygiene suggests the query whether this important aim may not itself be thwarted by beginning the instruction at too early an age when attention is likely to centre on the mere formal processes, and correction by reference to the facts of experience is not likely to occur.

The question of the age of beginning arithmetic is really a question of when instruction in logical thinking should begin. The answer in general terms is that training in logic should not begin until a child has a sufficiently rich experience to protect against a habit of thinking without regard to the truth of the major premise.

More concretely there seems then to be ample reason for postponing the work in arithmetic until the age of ten, or more accurately to that stage of mental development which is likely to be found in normal children at this age. While it is greatly to be desired that more investigations should be made in regard to this subject, with our present experience this seems to be a wise rule.

Of course the mere age of a child does not necessarily de-

termine his ability to take up a given subject without injury to health and mental development. In individual cases it may be permissible for a child to begin work in arithmetic at an earlier age, but the safe rule from the point of view of hygiene is this: in all work in arithmetic previous to this age there should be no formal instruction. If the child has a genius for mathematics he will spontaneously anticipate work allotted to a later period, but parents and teachers should not set formal tasks in this subject for children of an earlier age.

In Germany there has been a great controversy in regard to the question of object teaching in arithmetic, or the use of *Anschaungsmittel*. One school maintains that number cannot at all be presented to sense perception, it is rather a concept of concepts, to be referred to the mind, and it would be futile to desire to objectify it to sense perception. Another class think, on the other hand, that number is meaningless unless it is rooted in the real soil of sense perception; and especially in the first instruction in arithmetic the objectification of number is absolutely necessary. Of those who hold to the latter view some would represent numbers by pictures or the like and others by an unbroken series. There is a vast literature on this point, (20) and many experimental investigations have been made. All this controversy interests hygiene relatively little; for if the instruction were postponed till the proper age, most of the devices would probably become unnecessary. That a certain real danger may be connected with their use is clear enough from the number arrests so commonly found by Triplett.

The one thing that is important in the early instruction is to begin with the number relations of the concrete things in the child's own experience. This is the natural and normal starting point; but the practice of the schools has largely been to reverse this order and to begin with rules and abstract number relations and then only in the last years of the course give instruction in applied arithmetic.

Much of the work in arithmetic for the lower grades has been too difficult. Several years ago a committee in Boston, at the head of which was President Walker, investigated the subject and found that in the Boston schools a good deal of the work in the lower and middle grades was really work in logic rather than in arithmetic, and it was severely condemned by them; and in general it was found that too much and too difficult work was required in this subject. (30.)

A concrete illustration of such work was reported by a New England superintendent a few years ago as follows:

"While inspecting a B grammar room I saw this problem
aced upon the board, which the pupils were expected to

perform. 'A grocer's quart measure was too small by half a gill. How much did he thus dishonestly make in selling four barrels of cider, averaging 34 gals., 2 qts., 1 pt. each, if the cider was worth 24 cents a gallon?' This is not an isolated case; it is only one of the many problems which teachers continually give and examiners require that are wholly above the heads of children and can only be solved by an adult with a pretty clear head for reasoning."

Mathematical puzzles have been frequently given in arithmetic from the time of the Middle Ages. An interesting collection is given in the work of Claude Gaspard Bachet de Mezériac, *Problèmes plaisants*, and the following is one commonly used:

"God greet you problem. God greet you with your 100 scholars! We are not 100 scholars; but our number and the number again and its half and its fourth are 100; how many are we?" (13, p. 160.)

It is still true that considerable of the work in arithmetic might be simplified or profitably eliminated. As Steuer remarked some years ago: "The whole arithmetical instruction urgently needs complete transformation. The pupils are wearied with the driest calculation of literal problems, they are deadened with the most inconceivable cram formulæ which are never used either in pure or applied mathematics."

The logical puzzles of the older arithmetics, the bastard logic as Gen. Walker describes it, and the complicated problems which have little or no relation to practical life, have at least no place in the earlier grades.

Steuer in his *Methodik*, (20 a) published in 1883, sifted and weighed the traditional material in arithmetic according to the law, "First, the essential and then the pleasant and useful." In Germany as in this country it is felt that time is wasted in arithmetic. Steuer following, if I mistake not, the general regulations of the ministry, recounted as essential the following parts of arithmetic: (1) simple examples with whole numbers under the fundamental rules of arithmetic; a part of the exercises with common fractions; simple examples under the fundamental rules of decimals, in reckoning prices, profit and loss, discount, damages and the like, simple examples in interest, in mensuration and in reckoning time. (2) Compound examples arising by repetition of the same fundamental operation or by natural and appropriate combination of different fundamental operations, in reckoning cost, in reckoning profit, interest, discount, and the like, in mensuration, in reckoning averages, in partnership and in various kinds of reckoning.

The following should, he thinks, be excluded. Written examples under the fundamental rules with numbers named

in several different ways, a great part of the examples in reckoning time, part of the exercises in common fractions, the greatest part of the examples in simple proportion, the examples in compound proportion, a great part of the examples in interest, examples in changing decimals to common fractions, square and cube root and some other things might, he thinks, be omitted.

It is especially necessary also in this subject to eliminate unessential parts and unessential processes. That much time is wasted in such unessential elements is indicated by the investigations of Mr. Stone (27) and is corroborated by observation in the schools.

Finally, it is demanded that attention should be given by teachers to the hygienic aspects of instruction in arithmetic. In their attention to the primary product of their work, in their zeal for arithmetic as a subject and their devotion to pedagogical method and the practical demands of speed and accuracy, teachers often become blind to the obvious matters of hygiene; and the secondary results of instruction in this subject and the more subtle injuries to the mental health they are quite incapable of observing. Modern psychiatry and the study of mental hygiene unite with school hygiene in demanding that teachers should at least acquire such a prevision for matters of health that they shall be able to see when children become nervous and confused and when they are acquiring abnormal habits that will mean arrest of development. In the actual instruction attention to the hygienic aspects of the work was largely neglected in the older schools and is probably the exception to-day.

If we desired to make the subject as unhygienic as possible we should need to do little more than adopt methods that have been, and I fear are still in some places, in vogue. Prof. Safford (25), the well-known mathematician of Williams College, has given the following rules for making the work in arithmetic a failure, and they may be cited as an equally good code of instruction for making the work unhygienic. "First, divide your hours for arithmetic into theory, mental arithmetic and written, and in each division pay no attention to either of the others. Second, in theory proceed from abstract ideas. Third, arrange your mental arithmetic so that the children shall not employ any processes of their own. Fourth, have some special devices in mental arithmetic to throw dust in the eyes of the public. Fifth, in written arithmetic let each child do the sums from a book imitating a process which has been shown him but not explained. Let every one go on for himself, if he gets the right answer (by the key which you keep) say right, if not say wrong, and leave him to find out

for himself how to get a better result. Sixth, large numbers, unintelligible denominations, matters which the children do not understand, all these should be thoroughly employed."

It is the province of pedagogy to decide what shall be the content of the course in arithmetic and what methods and devices shall be employed, as well as what results in this subject may be reasonably expected. But practically the whole attention of many teachers seems to be directed to the primary results. They consider solely the methods, the ground covered, the total results in speed, accuracy, etc. The secondary results,—the habits of thinking formed, the mental automatisms acquired, the possible arrests of development, and the like, they do not attend to and they do not see; and often they are innocently and profoundly ignorant of the possibilities of their existence.

School hygiene has no quarrel with arithmetic. It does not object to drill nor to the devotion of a reasonable amount of time to the subject; but it does insist that the obvious dangers to health connected with this study in the case of some children should be duly regarded, and it insists that in all cases the secondary results of the instruction should not be ignored.

From the point of view of hygiene, work in mathematics represents a valuable form of mental exercise. Even in its more formal aspects it is a sort of gymnastics of attention and should be a source of mental refreshment and pleasure. If rightly taught it has the great advantage of giving a form of mental exercise where there is relatively little danger of confusion of association. In regard to what its real value as mental gymnastics consists in, what are right methods, suitable topics for instruction, and proper sequence, there has been much conflict of opinion.

Jean Paul Richter would place the instruction in arithmetic at an early stage in a child's development, because in his opinion arithmetical work requires no thinking and consequently puts no strain upon the child's nervous system. The great pedagogical poet probably in this case as usual saw an important aspect of the truth. It is doubtless true that the mere consideration of quantitative relations in connection with the activities of childhood involves no strain, and hygiene makes no objection to this, provided it is merely incidental to proper motor training and the study of things. And again Sir William Hamilton, already quoted, maintained that the routine of demonstration in mental training is analogous to the treadmill in the gymnastics of the body.

It has been a matter of general belief, however, that work in mathematics furnishes a high form of mental training.

Pestalozzi was one of the first in modern times to emphasize the significance of arithmetic for formal discipline. The aim of instruction, according to him, is to lead one to think while reckoning and to reckon while thinking. And Whewell, whose book on the Study of Mathematics was the occasion of Hamilton's critique, regarded mathematics as a logical discipline. In more recent times, however, many educators have taken a different view. Knilling, for example, declares that the mind never works more mechanically than in arithmetical computations, that it deals merely with words and symbols.

Between these extremes of opinion hygiene gets the right perspective by considering the psychology of the arithmetical processes.

Experimental pedagogy is now attempting to determine the facts in regard to the association processes involved in arithmetical operations, the ability of different mental types in such operations, the normal variations of ability with age, and sex; and especially the individual variations, and the value of different methods, with relation to different types and forms of ability, the value of discipline in this subject in relation to other school subjects, the value of drill, the secondary effects of different methods of learning and instruction, etc. From the results of such investigations it is to be hoped that the psychology of mathematics may be made so clear that methods may be devised which will develop individual capacity, and avoid interference of association and all those secondary results injurious from the pedagogical as well as hygienic point of view.

Dr. Lessing (16) has pointed out that there are two types of children; on the one hand, those naturally introspective who take pleasure in mathematical combinations and mathematical speculations; and second, those who are extrospective, who are early interested in observation of nature, in collecting plants, stones, in observing animals, and the like. The latter are interested in the qualitative details and peculiarities of the concrete case. The former are apt to reflect on the concrete case and seek the typical, the general, or the abstract universal. This distinction can be traced in the history of thought. In antiquity we have the contrast in the Greek natural philosophers and Eleatics on the one hand, and the Atomists and Pythagoreans on the other. The antithesis appears later in Plato and Aristotle, and in modern times in the scientists on the one hand and the special mathematicians on the other.

Experimental pedagogy is studying also the types of mental imagery in relation to arithmetical learning. Lobsien (17) in a

study of fifty pupils of the average age of nine or ten in the fourth school year of a boy's school, found that number-memory and ability in written arithmetic are unrelated functions, that the former stands in an inverse correlation to ability in mental reckoning. Only a small fraction of the pupils use visual number images in reckoning. It is quite different with acoustic number memory. There is a relation between this and both written and mental reckoning. Thus as a general result he finds that for elementary reckoning the acoustic number memory is almost exclusively the form of imagery used. This problem of the type of imagery involved in numerical operations and many other problems now being studied by experimental pedagogy are of distinct significance also to the hygiene of instruction.

It is possible also that the study of the natural ability, the methods employed, and the reaction time of pupils in arithmetical work may throw an important light on the problems of psychological age or mental development.

Experiments by Dr. Ranschburg in Budapest (23), for example, indicate that the time occupied by children in subtraction is an indication of their mental condition. The subtraction time for the majority of normal pupils in the people's schools for the weakest, slowest reckoners was 2 seconds or less for 60.9%, and more than 4 sec. in the case of only 8.7%. Among the feeble-minded pupils in the special classes 40.7% had a subtraction time of more than 4 sec. and only 14 of 2 sec. or less. Dr. Ranschburg estimates that subtraction times of 2 sec. or less among children of the age from 9 to 12 indicates intellectual normality with the probability of more than 90%, and subtraction times of more than 3 sec. among children in the schools up to the age of 7 or 8 may be considered as normal; after 8 years of age subtraction times of more than 3 sec. indicate mental deficiency with the probability of more than 90%, subtraction times over 4 sec. with the probability of about 100%.

Mr. J. C. Brown (5) has studied the effect of drill periods in the case of 51 pupils, and his results suggest the distinct advantage of such drill. Five minute drill periods upon fundamental number facts preceded the daily lesson in arithmetic in three grades. By comparison with other sections of equal size and approximately equal ability who had no such drill, they were distinctly superior. The benefit included increased efficiency in arithmetical reasoning and persisted after a lapse of twelve weeks vacation.

Thorough drill in the fundamental arithmetical processes is probably important for the thorough organization of knowledge which is essential for healthful progress in more advanced work.

It is only by experimental study of such psychological and pedagogical problems that a firm foundation for the hygiene of instruction in arithmetic can be laid, and a vast amount of careful investigation is here needed. In the present state of our knowledge the important practical rules in the hygiene of instruction in arithmetic may be summed up as follows:

Formal instruction in this subject probably should not be begun until the age of eight or ten. Whatever arithmetical work is done before this age should be spontaneous on the part of the pupil. By postponing the instruction until this age it would probably be possible in most cases to do away with the artificial devices and methods liable to cause arrests or interference of association. The work at first should be simple and complex, and difficult processes should be postponed until a later period. Processes involving logic should not be given until the pupil has acquired a rich store of concrete experience. Special care should be taken in the case of nervous children that no tasks or methods employed should be the occasion of worry or of the development of neuroses like chorea. Special attention should be given in general to the secondary effects of instruction important from the point of view of mental hygiene.

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HUMAN EFFICIENCY¹

A Plan for the Observational, Clinical and Experimental Study of the Personal, Social, Industrial, School and Intellectual Efficiencies of Normal and Abnormal Individuals

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The questions of first importance in the study of mental defectives are the questions of etiology, remedy and criminal responsibility. Etiology naturally claims a large share of consideration, because it is only after the etiological factors or agents of different abnormalities have been precisely determined, that we are in a position to prescribe effective remedial and prophylactic treatment, or to deal successfully with the educational problems affecting defectives.

The criminal and legal aspects likewise deserve a large measure of attention. Various forms of mental abnormality predispose toward criminality. It is of vital social importance to determine what types or classes of defectives lack moral insight, an appreciation of moral values, the ability to distinguish between right and wrong, or truth and error, the power of self-control, and the feelings of shame, obligation and guilt. What classes of defectives are incapable of living in a normal human environment? How do criminalistic tendencies and moral discernment vary with degree of defect, type of disease (*e. g.*, delusional insanities, epileptic manias), duration of disease, transitory states (well known are the occasional or transitory states of moral irresponsibility in some form of epilepsy and in delusional and manic-depressive forms of insanity, which show themselves in maniacal outbursts, and kleptomaniac, suicidal and homicidal tenden-

¹Read, in part, before the New York Branch of the American Psychological Association, Feb. 4, 1911.

Owing to the limitations of space it is impossible to enter upon a discussion here of the numerous questions connected with the psycho-clinical examination of defectives. The reader is referred to a companion article in the March and April numbers of the *Journal of Educational Psychology*, which treats of the functions of psycho-clinical laboratories in universities, medical schools, hospitals for the insane, institutions for the feeble-minded, juvenile courts and the public schools, and which discusses the qualifications needed by psycho-clinical examiners.

cies), and environmental conditions? The obligation of the state properly to protect the lives of its subjects, renders the study of questions affecting the moral responsibility of various kinds of defectives of fundamental social importance. The solution of the practical educational, custodial and legal problems concerning defectives will hinge largely upon the answers which scientific investigation gives to questions of this nature.

While the medical and legal questions are thus of commanding importance, it is also important to secure accurate knowledge concerning the personal, social, industrial, school and intellectual capacities and incapacities of various grades and classes of defectives, such as idiots, imbeciles, morons, lag-gards, epileptics and insane, blind, deaf, mute and crippled persons. There are thus five sides to the question of efficiency.

First of all, what is the *personal* efficiency of a given grade or class of defectives? What can the individual do for his own care and protection? Can he feed and clothe himself, avoid dangers and temptations, control the primal instincts of appetite, sex, love, hate, anger, fear, jealousy, pugnacity, etc.? Where does he stand in the *personal efficiency* scale? What is the amount of his *personal efficiency retardation*, as measured in terms of the personal capacities of a normal person of the same age? The answer to these questions involves the establishment of *age norms* of *personal efficiency*—a task that probably cannot be done with any nicety except for the first years of life.

In the *second* place, what is the nature of the *social* capacities or incapacities of a given defective, or a typical defective of a given class? Is the individual able to communicate his ideas or desires through written or oral language or through cries or gestures? Can he converse coherently or intelligently? Does he seek or avoid social intercourse, conversation, entertainments, games, etc.? Is he socially-minded or anti-social? Is he chummy, entertaining, generous, sympathetic, timid, retiring, fretful, suspicious, deceitful, quarrelsome, slanderous, brutal, murderous, lascivious, sexually immoral, subject to exhibitionism, or negativism, lying, thieving, etc.? Does he fit into the social organism? Can he so adjust himself to the customs and rules of society that he will not become a public menace? In short, what is the character of the individual's social deviation? What is his *social efficiency* age? Is he on the level of the morally undiscerning civilized young child, or in the stage of the brutal adult savage?

In the *third* place, what is the *industrial and vocational*, or *motor*, efficiency of various defectives? What kinds of work can they do, and how well? How much can they do for

their own support? What particular capacities are present or lacking? What special existent occupational interests may be utilized? What is the individual's attitude toward work and toward supervision and correction? What are his learning capacities? What working habits can he form? What new tasks can he master? To what extent are his industrial capacities improvable by training? What is his best line of work? How does his industrial efficiency vary from time to time? (Witness the striking variations in epileptics.) What is the productive capacity of a given defective in comparison with a normal person of like maturity, and to what extent can the productive capacity be increased? In a word, what is the *amount* of the *motor* or *industrial defect*, or what is the *motor and industrial age*, of a given defective? These questions demand solution before the pedagogy of the industrial and vocational training of defectives can be placed upon a satisfactory basis, and before the labor of the patients in institutions for defectives can be so organized as to afford maximal returns.

In the *fourth* place, what is the nature of the *academic* or *school* capacities of different grades and classes of defectives? What sort of lessons can be mastered? In which branches do they make progress? Which subjects are worth teaching? What methods must be employed to obtain maximal results? How does the *rate* of progress differ from the normal rate (the rate with normals)? What is the precise rate and character of the improvement from month to month or year to year, as measured by scientifically devised serial tests of equal difficulty, of those mental functions which are central in the learning process; namely, perception, attention, association, memory, imagination, linguistic construction and reasoning? What sorts of improvement prove to be permanent, what merely transitory? What are the special difficulties of a given defective? What are his native or acquired interests, attitudes, ability to observe, judge, reason, form habits, adapt himself to changed schedules and new conditions, to learn by instruction, or imitation, or hit-and-miss experimentation, or repetition (drill processes), or reasoning? How many years *over-age* is the child for his grade? That is, what are the nature and extent of his *pedagogical retardation*? What is his *pedagogical age*? We cannot hope to adapt our curricula to the varying needs of defective children until we have thrown the search-light upon these vital school problems.

Finally, we have the basal question of the *character of the intellectual disorganization* and the *degree of the intellectual arrest* of various defectives. This question is fundamental, because all the other capacities depend more upon the intel-

lectual integrity of the individual than upon the integrity of any other group of functions. Here we must ascertain, not so much the range of the individual's information or his *erudition*, as the degree and character of his *native* and *acquired* intellectual *grasp, capacity, or ability*. Is his intellectual development normal, or has it been arrested from the start, or has it become atrophied with time? What particular intellectual functions have suffered the greatest impairment? Where along the intellectual highway from the low grade idiot up through the imbecile, moron and laggard to the normal person, has the individual stopped? What, in a word, is the individual's *intellectual age*? Can this be determined in definite units, or by diagnostic age tests, more precisely than can be done by observation or by the use of school grades?

The above are fundamental questions which must be properly answered before we can presume to deal intelligently with the problems affecting the housing, segregation, care, treatment and education of public school and institutional types of defectives, or before we can deal intelligently with normal and supernormal children.

At The New Jersey State Village for Epileptics¹ we are attempting, in addition to medical, hereditary, and anthropometric research and cognate lines of psychological work, to throw some light upon these questions by observational, clinical and experimental methods, and have prepared a series of record blanks on which to record the data. These forms are uniform in size with the other forms in use in the institution and are so made that they can be gathered into book form, and thus provide a *case history* for each patient.

In order to determine the patient's *intellectual* status we are giving the *form board test*, which throws light upon the patient's ability to visually identify forms, upon his constructive capacity and his power of muscular co-ordination; the *hand dynamometry test*, which roughly tests the power of voluntary attention and effort, and particularly the power of muscular exertion; the *Binet-Simon diagnostic tests* of intellectual development (all of the above are on *Form I*); and a set of six *serial* or *consecutive controlled group tests* (*Form V*²). The latter tests are given serially (at present one set

¹ A laboratory of clinical psychology was established by the Board of Managers at this institution, on the recommendation of the superintendent, Dr. D. F. Weeks, in the fall of 1910.

² Four of the forms were distributed at the meeting. Form I also contains a number of miscellaneous tests; Form II deals with the "effect of convulsions on mental traits and capacities;" Form II is a "personal, social and industrial efficiency report;" Form IV is a "school efficiency report;" and on Form V is recorded "serial experimental tests of the growth and improvement of mental traits and capacities."

each month) to somewhat over thirty of our brightest epileptic school children, and to somewhat less than 100 dull, average and bright pupils from the second to the third high school grades in the public schools of Hopewell, N. J. Owing to our late start these tests can run this year only during six months; it would be better to give them once every second month during the course of a year; and, after norms have been established, once or twice a year. These group measurements embrace tests of the mental processes fundamental to intellectual operations (perception, attention, association, memory, imagination, and linguistic construction; tests of learning capacity are not included in this year's set. The aim has been to make each of the six successive tests in the same series equally difficult, and all so difficult that no one can make a perfect score, so that they may serve as an experimental *measuring scale* of the growth and improvement which various mental capacities or traits undergo from month to month or year to year. By giving them under the same conditions they will also afford a reliable *comparative scale* by means of which to measure the differences in the capacities of various classes of children and defective children, (normal, bright, dull) and the differences in the rate of improvement in these capacities. Several of these tests were originally prepared for use with a "dental squad" of Cleveland school children receiving special prophylactic and operative dental treatment, in order to measure in definite units the effects of such treatment upon mental efficiency. The use of these tests for this purpose during the past year has given gratifying results. By carrying out such tests as these, from season to season, or year to year, upon large numbers of normal, supernormal and retarded pupils in the schools, we shall be able to plot a *normal curve of improvement or development* of various mental traits, and thereby obtain more precise knowledge respecting the *development defects* or accelerations of abnormal children. The twelve tests which I have worked out—two are repeated during the following sitting in such a way as to transform them into new tests—may not afford the best measuring scales, but they furnish an initial set which can be altered and improved as experience demands. The materials for these tests, together with the directions for giving them, will appear in print in due course.

The Binet-Simon measuring scale, with which we have made a survey of the entire village, enables us to make quite a satisfactory determination of the degree of intellectual arrest. The tests, however, are vulnerable in their present form at various points. First, the *methodological technique* has not been sufficiently refined or standardized to meet with the

fundamental prerequisite of all scientific work, namely the establishment and employment of *controlled* and *standardized* conditions of testing, so that the experimental procedure can be exactly repeated. The further standardization of the tests cannot be made until they have been thoroughly tried out by expert examiners. By actual testing we shall acquire the best methods of giving the various tests.¹

Second, the scale requires *revision*, *rectification* or *amplification* at various points. Some of the individual tests are out of place, either too high or too low; the aggregate difficulty of the tests for a given age may be greater than that for a higher age; some tests are of questionable utility, notably those for the higher ages; the tests need to be extended so as to include more of the teens, and this is more difficult because in the teens one year makes less difference in intelligence than one year during the early years of childhood. Moreover, it is not yet certain whether the scale is applicable to the higher grade adult demented or to slightly retarded adolescents (it seems to apply fairly well to most *demented* idiots, and particularly to *amented* idiots, imbeciles and low grade morons); nor is it certain that the same tests are applicable to both boys and girls, except during the preadolescent period, owing to the difference in the physiological, psychological and pedagogical maturity of boys and girls of the same chronological age.

Third, after the tests have been repeated sufficiently often in a given school or locality to render them *familiar*, it is possible for the higher grade examinees to compare notes and *coach* one another. This will enable some pupils to pass the tests beyond their intellectual age, and will transform the measuring scale into a series of tests of the *ability to learn particular facts* or to acquire particular accomplishments, by dint of direct instruction. But the scale is not designed to test the momentary capacity to acquire a *determinate set of facts by special instruction*, but to measure the capacity to

¹For suggestions consult the following: Binet and Simon: *Le développement de l'intelligence chez les enfants*, *L'Année Psychologique*, 1908; Goddard: *Binet's Measuring Scale for Intelligence*, *The Training School*, VI, No. 11, 1910; Whipple: *Manual of Mental and Physical Tests*, 1910, Chapter XIII.; Huey: *The Binet Scale for Measuring Intelligence and Retardation*, *The Journal of Educational Psychology*, I, 1910, 435; Johnston (Katherine): *An English Version of M. Binet's Tests for the Measurement of Intelligence*, *Training School Record* (London), November, 1910. (The tests for age 11 are here transferred to age 12, leaving 11 unsupplied; the tests for age 12 are moved up to age 15; and the 13-year old tests, with two additions, become tests for ages beyond 15. This rearrangement probably meets with Binet's approval, since the revision was submitted, according to the author, to his criticism.)

solve certain problems without special preparation. They are intended to be a measuring rod of the intellectual capacity or strength which normal children of various ages and of a given type of civilization should have developed as a result of normal growth and development. They thus supply a series of *age norms* of native and acquired mental capacity; not of *native* capacity only, as has been assumed. It would be fatuous to attempt to construct a scale for the measurement of pure native capacity, for pure native capacity, after the first few month's of life, is a pure figment of the imagination. Only by excluding the physical and social environmental influences would there be any possibility of measuring native endowment independent of acquired capacity. A measuring scale will therefore measure both native and acquired capacity. Just as native capacity differs with individuals, so will the capacity to acquire differ with individuals; but there is probably a certain *rate* of acquisition which is fairly *normal* in a given order of civilization, so that it will be possible to establish *norms* which hold for the great mass of average or typical individuals.

Fortunately the difficulty of which we have just spoken—the possibility of being coached so as to pass some tests—can be met by devising *substitute* or variant forms of equal difficulty for some of the tests.

Fourth, the corrective formula, or the method of giving advance credits (one year for every five points passed in higher ages) sometimes creates difficulties. This is due to the fact that the number of tests in the various ages is not uniform. In four ages it is four (ages 4, 5, 10 and 12); in two it is five (3 and 11); in two six (8 and 9); in one seven (6); and in one eight (age 7). The consequence is that the subject sometimes receives too few and sometimes too many credits. To illustrate cases from my experience: if the subject passes age six by virtue of two failures in age seven, he can obtain one and one-fifth year of credit for age seven; *i. e.*, one-fifth of a year more credit than if he were credited outright as having passed age seven. The maximum discrepancies which I have found arising from these inequalities have amounted to about a year. This difficulty, however, is not innate in the tests themselves, and can be overcome by equalizing the number of tests in each age, and revising the corrective formula as may be needed.

The above are some of the criticisms suggested by the use of the Binet-Simon tests with somewhat over 350 epileptics. The fact that the tests have not been brought to a state of perfection makes it all the more imperative that they should be tried out with great *thoroughness* on a large number of men-

tally and physically normal public school children, so that we may locate the weak spots and construct a scale which will be valid for the typical American child. When returns have been collated from a large number of such tests, given under uniform conditions, we shall be in a position to eliminate, revise and amplify. This is *one* way in which the tests can be successfully improved. But it is necessary to emphasize that the testing must be a *thorough-going try-out*. To examine five or six pupils in an hour at a given level in the scale means partial and perfunctory work, and will render the try-out essentially unscientific. We cannot hope to establish reliable norms for children by a slap-dash examination of wholesale quantities of pupils. It is better to try the scale out thoroughly with 1,000 pupils than partially with 10,000.

A second way in which to improve the scale, is to undertake a systematic survey of the intellectual capacities of normal boys and girls at different ages. What, *e. g.*, can the typical six-year-old or 12-year-old boy or girl do intellectually? To answer this question fully we need to gather and compile extensive observational data from classroom teachers, expert paidologists, parents and intelligent observers who come into direct daily contact with children.

At the Skillman institution we are attempting to gather such data for our epileptic school children by means of a syllabus on the school efficiency of the pupils. School efficiency depends primarily upon intellectual capacity and thus furnishes an index of intelligence. From these reports, made by the teachers, we hope to gain information regarding the characteristic intellectual capacities of epileptics of various chronological and Binet-Simon ages and of various degrees of arrest. This information will possess a unique value when brought into correlation with other reports and the various experimental tests. As soon as we have extensive data of this character for large masses of normal children, we shall not only know something definite regarding the intellectual capacities of children of different ages, but we shall have taken an important step toward the construction of an adequate measuring scale of intellectual development. Such a programme of work as this can only be carried to a successful conclusion by a properly organized and a well-manned department of clinical psychology, or bureau of research, in the public schools, in a university, or in an endowed private research foundation.

It is probably not necessary to hold a brief in this day for the necessity of undertaking such a survey as this. There is a vast army of repeaters in the schools which threaten to

become a national menace. Statistics¹ from all sections of the country show that about half of the pupils in the public schools are retarded; that is, that they are two or more years over-age for their grade. At the present time, our ignorance concerning, and our neglect of, the best care, treatment and education of arrested children, stand out as a national disgrace. We know little at present that is scientifically accurate regarding the degree or character of the physical and mental arrest of our repeaters. We do therefore stand in need of comprehensive serial graded tests of intelligence, so that we may determine, not only the intellectual age of deviating children, but the nature of the mental functions most seriously affected, and the character of the arrest (whether permanent or temporary). It is sheer folly to spend millions of dollars trying to educate children for an intellectual career, who are permanently retarded. There are instances on record where arrested pupils have made practically no progress during a dozen years of schooling, or where they have actually retrogressed. We have with us 19-year-old epileptics who are doing second and third year work. We should be able to determine by means of a scientific diagnostic (intelligence) scale whether a given subnormal is a custodial or institutional case, or a case for one of the special classes in the public schools (for retarded, blind, deaf, mute children, etc.). Binet has given us a "first-aid-to-the-sick" device, just at the time that we are awakening to a realization of the magnitude of the problem of mental deficiency.

While the *intellectual measuring rod* is fundamental, we stand in need of a *motor scale* of development, or a combined intellectual-motor scale. This need arises from the fact that a sixteen-year-old child chronologically may have a twelve-year-old intellect and a fourteen-year-old musculature. Such a child is reasonably strong muscularly; he is able to execute and co-ordinate his movements with skill; he can perform quite complicated manual operations; he can master fairly difficult industrial tasks; he can retain motor acquisitions, and form stable muscular habits. Although he may be accounted an intellectual laggard, he ranks quite high in motor capacity and manual dexterity—a fact which is being demonstrated day by day in the manual training and industrial classes in the public schools. Such a child would, then, be fairly normal on the motor side.

Since, therefore, the intellectual and the motor developments will not in all cases coincide, we need a series of *motor*

¹ See *The New Clinical Psychologist and the Psycho-Clinicist*, The Journal of Educational Psychology, April, 1911.

diagnostic tests arranged in a graded scale, in order that we may know what a normal girl and boy can do industrially, or in a motor sense, at different ages. It should be possible to construct such a scale for, at least, the periods of childhood and early adolescence. Having both the intellectual and the motor scales, separate or combined, we shall be in a position to say whether the child's defects involve in equal measure the intellectual and the motor functions, or which of these two have suffered the most impairment, and to what *extent* the arrest has set in. The pedagogical value of such a differential diagnosis is obvious. Instead of allowing teachers to consume their energies and the energies of the pupils for years, trying by some sort of intellectual legerdemain to fit round boys and girls into square holes, we shall be able to prognosticate by means of standard tests the probable future pedagogical development of the arrested child, and thereby be able to plan a course in which he will make the greatest progress. This will not only redound to the good of the child, but prevent much pedagogical blundering, loss of time and money, and vexation of spirit.

Unfortunately there is no existent motor or industrial scale of development for normal children, comparable with the Binet-Simon intellectual scale. At Skillman we are making an attempt to construct such a scale for epileptics, by collecting extensive observational data from the officers, supervisors, attendants and employees of the institution, bearing upon the industrial capacities of the patients who are employed in various forms of indoor and outdoor work. From the results thus obtained we are hoping to construct a *motor scale of development* for each Binet-Simon age. It is evident that such a motor scale would possess greater value if we were in a position to turn, for purposes of comparison, to a motor scale for *normal* and supernormal individuals. The need of a normal industrial scale is felt as keenly by the student and trainer of the special child, *whether* subnormal or supernormal, in the *public* schools, as by the student and trainer of institutional types of defectives. Departments of child study in the public schools and research departments in institutions for defectives should make an attempt to gather extensive industrial or motor data by some such means as those we are now using.

Finally, we are also securing detailed reports on the *personal* and *social* traits and capacities, the *moral* characteristics and *criminal* tendencies of our patients. The data on the personal capacities will supply additional material for our comparative measuring scales. There is need of a similar systematic study particularly of the moral and criminal traits of the abnormal,

mischievous and delinquent pupils which people our schools, and of the criminals which menace our civilization. This data should be secured, in the first instance, for the socially maladjusted child in the preadolescent years, before the criminalistic tendencies have become confirmed. Only when we have in our possession extensive facts of this character will we be in a position to place our pedagogical and moral training and prophylaxis, and our custodial care and treatment of abnormal and criminal individuals upon a satisfactory basis.

When we have given the same amount of careful, expert study to our normal and abnormal human population that the government is giving to Indian corn or the American hog; when we have devoted the same scientific attention to the production of superb brain crops that experts, under government subsidy, are now giving to the growing of superior grain crops: then we may hope to make education a genuine science, and the institutional training, care, treatment or penalization of defectives, dependents or criminals a real art. The view that public institutions, in addition to their recognized duties, should function as research laboratories, is rapidly gaining wide acceptance. Just now we stand in great need of extensive *mass* studies: a broad survey of the total field of human capacity. It is with this idea uppermost that we have prepared a set of *efficiency* blanks at Skillman for the systematic recording of observations. The method at present must necessarily be somewhat crude. But in time we shall have just as refined a technique for studying the human plant as we now have for studying chickens or horses.

INTELLECTUAL PRECOCITY. COMPARISON BETWEEN JOHN STUART MILL AND THE SON OF DR. BORIS SIDIS

By TOM. A. WILLIAMS, M. D.

Instances of juvenile precocity have attracted attention in every epoch of historical time. At one time they were regarded as *lusus naturæ*: they were supposed to be allied with genius, and each was thought to be insusceptible of explanation and beyond human control.

Nowadays, however, both precocity and genius are subjects of study, and are coming to be regarded as both explicable and controllable, within certain limits. We have now transcended the erroneous doctrine of Lombroso that genius was related to criminality. When the genius is criminal he is so independently of the qualities we call genius. These, however, draw attention to his criminality by the very distinction they give to all his deeds.

Of precocity, the relationship to neuroticism has often been declared; but our analysis will show the error of this view unless it is greatly qualified. While it is true that many children apparently precocious in an intellectual sense are unstable mentally, incapable of sustained effort, and become adult nonentities without special capacity, yet these misfortunes are by no means functions of the precocity of these individuals; but are due to faulty bodily hygiene, intemperate and ill-timed mental labor and to excessive emotional stresses in an individual who has not learned to master the moods.

As a matter of fact proper mental labor is needed for sound psychic health. Physiologists know that a disused organ is more liable to disintegration or to become diseased than one which is regularly used. I need not expand what is an axiom.

But an impression prevails that growing organs should not be subjected to work. This is a gross error; for organs which do not work cannot grow well. Even the bones become tough, hard and large in proportion to the stresses to which they are subjected by frequent and vigorous pulls where the muscles are attached. The comparison of the aver-

age male skeleton with that of the average female strikingly illustrates this fact. But proper development is possible only during the period of growth, the growth in adult structure being relatively slight, however great is the exercise of function. What is true of structure is true of functional power. From ballet dancers to violin virtuosi, artists must be trained from early youth. It may be objected that this is so because muscular agility is required; but this objection is only superficial; for dexterity of an artist is made possible not in virtue of superior co-ordinations of movements themselves but by means of the superior speed and accuracy of the guiding mental processes, which reside in the brain.

Now as intellectual dexterity is also a function of orderly functioning of mental processes seated in the brain, it should be manifest that these too should reach excellence best when they are trained by a capable hand during the formative period of early youth. This *a priori* assumption I believe to be borne out by experience; for in the cases of those children who have been deliberately guided to intellectual or other excellence, their trainers and the pupils themselves, when qualified to judge, unite in declaring that the precocious individual is in reality not *naturally* extraordinary.

John Stuart Mill, himself, declares that both in memory and understanding he was considerably below the average of boys of his age; in spite of which his early training gave him what he declares to have been an advantage of twenty-five years over his competitors in after life. Dr. Sidis, himself, states explicitly that his boy's apparent genius is only due to the training of his intellectual activities in early life; although he invokes in partial explanation a doctrine of reserve energy of which we shall speak at a future time.

In the moral sphere the same may happen. Eleanor Davids took from an orphan asylum an entirely ordinary boy aged five, of bad behavior, without ethical notions; and in one year she trained him into a well-mannered, truthful youngster far above the average.

The Guidance of the Inclinations and the Formation of Tastes as a Factor in Successful Education. The tremendous generalizing power and analytic profundity of Herbert Spencer led him to the conclusion that human actions did not spring mainly from intellectual motives, but that they were chiefly instigated by the feelings. Although Descartes wrote a whole treatise on the passions of the soul, the study of the feelings has only recently acquired its due place among psychologists. It is to the psychopathologists that great credit is due for the stimulus which the study of the feelings has lately received. It is in the psychopath that the exacerba-

tions of feeling become so conspicuous as to excite the attention even of the superficial. From the well marked types of *affective*¹ reaction recognized by observing insane, perverted or peculiar people, it has become possible to apply the generalizations gained from pathology in the interpretation of the occurrences of ordinary life. In this way we have found a key to unlock many of the motives of ordinary life which escape analysis when regarded as intellectual manifestations only. Before giving instances some general notions must be set forth.

Self-analysis reveals always with every thought or act some state of feeling or another. This profoundly affects the consciousness; although its effect may not be explicit or even noticeable until attention is drawn to it. The Germans describe this element of the psyche as *Gefühlston*, feeling tone. If you will think of the time when you "felt good," of another time when things felt tiresome, of another time when you felt indifferent, of another when "blue," you will have an idea of four variations of feeling tone.

But in human beings "*Gefühlston*" is always part of a larger consciousness which contains also other sensations, as well as thoughts, ideas and tendencies to act. With each of these becomes associated a particular feeling tone, whether painful, pleasurable or indifferent, more or less.

It is these combinations which form the bases of the *sentiments*, as the French call them, such as love, hate, anger, pride, ambition, benevolence. An *emotion* may be regarded as one of these in ebullition, during which the physical features which condition it are so conspicuous as to be observable to the ordinary eye and sometimes even measurable by instruments of precision. A *sentiment* cannot be observed except by the dynamic reactions which we call psychological; and even then judgment is more or less approximate. But we know it by introspection, and can describe it to one another more or less tolerably, so long as we speak of *usual feelings*.

But nothing is more striking in the practice of a psychopathologist than his frequent meeting with people who mention feelings which language fails to describe. The reason they cannot describe them is that the feelings are entirely new and unparalleled in their experience; so much so that it is common for me to be asked, "Can it be that you have ever had a patient like this before? I am sure that no one can feel like I do."

In essence, the *feeling tones* are merely an evolution from

¹ A term first used in psychology to denote that which pertains to the feelings.

the organic sensations of chemical nature which cause unicellular organisms to be attracted or repulsed in certain environments. Whether we use the term consciousness or not, the lowly organism receives an impression which results in an organic state observable through the movements to which it gives rise. In the same way in human beings, an organic state which we ourselves can from introspection call a state of feeling, may be observed by others only because of the movements or attitudes to which it gives rise. Thus in the melancholic individual, the brow wrinkles, the mouth droops, the shoulders sag, the hands turn inwards, the back stoops, the mobility of both face and body is retarded, speech becomes slow and feeble, while he himself feels miserable and dejected. In the contrary picture, a person feels radiantly happy, his movements are quick and energetic, the expression of the face is laughing and radiant, the speech is voluble, and shows rapid if not coherent thought.

Now, the one man's happiness does not come from his surroundings, nor is the other's misery caused from without. Each comes from within: it is the *feeling-tone* which is at fault. In the one case, it is excessively pleasurable, and in the other has a painfulness which the patients declare cannot be conceived.

Now, in these cases the state of the feelings is irrespective of the content of the patient's mind; although the patient very often believes quite the contrary and interprets his feelings in terms of his thoughts and surroundings.

But *feeling-tone* can be strongly influenced by surroundings, and by the activities imposed upon the individual. In the first place, the healthy young animal is impelled by a desire for activity in accordance with the physiological law that need or desire creates discomfort, which is the incentive to stimulate movements aimed at satisfying the need. The hungry animal does not sleep, but ranges actively in search of food; the well-fed horse gambols in the pasture to give vent to the energy which it has stored up. A race horse cannot be trained in a stable.

Hence feeling-tone may be made painful by ideas. This may appear anomalous until one remembers that an idea is only the resuscitation of a number of former impressions concatenated into a system. Thus, if any of the impressions which have in the first place composed a particular idea has been a painful one, that whole idea will be imbued with painful *feeling-tone*, and each time the sentiment is felt will be unpleasant in so far as the complexus is dominated by the particular notion which arose during, or was the cause of a disagreeable *feeling-tone* during its earlier occurrences. But

if one or more of the other component impressions forming the complexus which we call an idea has occurred during or has been the cause of agreeable *feeling-tone*, the disagreeable one may be not only neutralized but overwhelmed, and the total idea may become quite pleasant. This principle is unconsciously used by skillful pedagogues; and the procedure is most effectively employed in the treatment of the psychoneuroses, sometimes in the reverse direction of endowing with disagreeable *affects* an idea system of pleasant *feeling-tone* which incommodes the patient's life of relation. Sometimes, indeed, these morbid *affects* of pleasant nature may so dominate a patient that he or she is a standing misery even to him or herself, and work and amusement are alike impossible.

Thus a patient of Professor Janet had her life made intolerable by the constant image of a man with whom she was in love. She desired to shake off the recollection, but failed to do so unaided. Professor Janet enabled her to do so, however, by associating with the complexus which formed the image of her discarded lover the face of a pig. This made the whole idea so obnoxious to her that she no longer took pleasure in the obsession, and was enabled to shake it off.

The importance of "feeling-tone;" pathological paradigms. Now, all this may not appear to bear very directly upon the intellectual education of a small boy; but, in reality, it is the key to the whole problem. For if there is a persistency of disagreeable *feeling-tone*, not only is functional capacity at the time much lowered, but nutrition itself suffers. A common illustration of this is the effect of such grief as comes from domestic bereavement. So long as it is permitted to dominate the mind, effective work is not possible; and if the grief is not quickly transcended, emaciation, sallowness and muscular weakness ensue in consequence of the impairment of the functions of the digestive glands. This explanation is not a mere hypothesis, but is confirmed by physiological experiments, which show that it is a biological necessity, and holds for lower animals. It is an endowment of specialization of the nervous system, and is by no means a function peculiar to the human soul, as was formerly maintained. Thus Pawlow by threatening dogs with a whip completely suspended the flow of the gastric juices after eating a meal. And in the contrary sense, he showed that the sight of food without its ingestion was enough to cause the juice to flow. That this was not a simple reflex, he proved by substituting for the sight of food the ringing of a bell or other stimulus which he had taught the dog to associate with feeding time. This caused the *feeling-tone* of pleasant anticipation, and the flow of gastric juice. While in the contrary sense again, it is not at all

necessary to actually show a whip to the dog; for any other stimulus can be used to arrest gastric flow, provided it has acquired by association the property of producing disagreeable *feeling-tone*.

The most striking human example of nutritional disorder from a purely psychological cause is that known as the traumatic neurosis, that is to say the nervous depression which occurs in some individuals after the supposed shock of an accident which has not caused serious physical injury. These patients sometimes suffer pitifully; but the whole source of their trouble lies in an idea that they have incurred a shock of such a nature as to inevitably induce grave nervous disorder. The concentration of the mind upon this notion produces so disagreeable a *feeling-tone* that the health is secondarily affected by brooding over it. When this mechanism of the disorder is clearly understood by the physician it is not difficult to cure the patient unless psychotherapeutics is interfered with by unwisely sympathetic friends or venal legal advice.

Another instance of a psychologic origin of impaired function followed by nutritional disorder is afforded by some cases of what is loosely called nervous dyspepsia. Many of these arise merely from a morbid anxiety about what the patients can digest and should eat. This arises in ideas of false nature about themselves and their food. From these ideas arises an unpleasant *feeling-tone*, which amounts to an actual dread. This interferes with the nutritional functions; and hence such people's personal and social efficiency is much impaired.

Such then are the incommoding effects of disagreeable *feeling-tone*, and it will be easy from this principle to deduce the necessity of achieving an agreeable *feeling-tone* if one wishes to make the most of the intellectual capacities of a growing brain.

Suitable studies and prejudicial attitudes of elders. Now, at the first blush, it would not appear that a boy aged four would derive agreeable feeling tones from the study of Greek vocables or anatomical nomenclature and the relations of the bones of the skeleton. These do not look like suitable studies for children of that age; but the intellectual education of John Stuart Mill was begun by the learning of Greek vocabulary, while that of Dr. Sidis's boy was begun by the study of anatomy. The choice was in both cases largely circumstantial, for James Mill was a classical scholar and believed in beginning with the oldest and simplest of the school languages, while the Sidis boy's mother happened to be studying anatomy at the time the little boy's quest for intellectual pabulum had ex-

hausted the casual potentialities of the household. She could without great effort aid his study of the skeleton while the boy played on the floor, while James Mill had no great difficulty, at first, in initiating the study of Greek vocabulary. One hundred years ago the road both to learning and intellectual discipline lay through the classics. Nowadays it is believed that children's needs of the concrete are best satisfied by objective study in the sciences. No doubt this doctrine largely influenced the facilitation of the Sidis boy's studies of anatomy.

The fact that each boy learned with facility at that age proved that the task was agreeable; for it is impossible for more than a short period to maintain the attention of a small boy towards any subject while it remains distasteful. It is true that a subject may be approached with distaste and yet interest may be maintained for a long period; but that is because interest is acquired during the performance of the task. I do not here refer to the extrinsic interest arising from desire of accomplishment or the hope of praise. I mean intrinsic interest in performance. I think that every one here must be familiar with instances where a small child has expressed unwillingness to inaugurate some simple performance which, after beginning, he soon becomes absorbed in and evidently enjoys. A disinclination of this kind may even extend to an organic appetite; and a child may at first refuse a dish which he finishes with gusto as soon as the whim has passed.

Such whims in the intellectual sphere are acquired with great facility from the surroundings. A child is much more observant of little gestures and attitudes than is an adult; for he is not so much dependent upon verbal expression, much of which he has grown up to believe unintelligible. Hence, the slightest indication of approval or distaste by a parent or domestic may arouse a notion in a young child which to the uninitiated observer appears autochthonous. Much of the belief in intuition would be destroyed by an appreciation of this fact. The lesson for us is that our prejudices can hardly fail to be conveyed to our children, however much we may believe them to have been concealed. Now, I venture to say that the vast majority of my readers would have to admit a decided prejudice against teaching either Greek or anatomy to a child of four; and of the remainder I believe that some member of the household could supply any prejudice lacking. Now, disapproval, even if tacit, is quickly sensed by the child; and hence prejudicial ideas are acquired by him with great facility. I may instance the case of a young man to whom a professional career had been closed because of the fact that he had not learned Latin,

in spite of serious efforts to do so at school. His inability to do so arose from the notion current in the family that for some reason or another he was not "good at Latin." This became a family tradition, and was made all the more bitter to the boy by the gibes of his elder brother. Fraternal amenities of this kind I have found not infrequently in patients with psychological disorder; and I say nothing of the feminine refinements of torture within the family.

Now, neither John Stuart Mill nor young Sidis had to encounter any such conflict regarding what was fit and proper to learn. Young Mill was carefully guarded from external commentary, and was entirely unconscious of the superiority of his attainments until it was explained to him at the age of twelve by his father. Inevitableness is to the childish mind a comforting character which forbids the anxiety incident to struggle, and hence permits of maximum efficiency. The older political and ecclesiastical systems were well aware of this principle, the forgetting of which is responsible for much of the unrest of our transitional period.

Seizing the favorable moments. As every moment has its feeling-tone, and as in a healthy human being it is impossible for the feeling-tone to be other than agreeable, it follows that there will be some pleasant moments connected with no matter what is given a child to do. The memory of these becomes attached to the idea of the thing done, which thereafter is a pleasant reminiscence. For instance, the pleasant *feeling-tone* which occurs in the process of satisfying youthful hunger is the source of the agreeable reminiscences of the bread that mother used to make, the delicious apples of one's childhood. As a matter of fact, the same bread and the same apples eaten in after life have failed to arouse the same enjoyment; but the idea of them is reminiscent of the old *feeling-tone* connected with the delicious sensation. Another illustration from everyday life is that of the retired business man, in whom the pleasures of youth fail to arouse the agreeable *feeling-tone*; and he has to go back to business in order to find it.

Hence the importance of seizing the moments of agreeable *feeling-tone* upon which to build acquirements useful to the child, rather than to dissipate them in futilities, as is so often done. Do not conclude that this precaution excludes games and sports from a child's life; for as we shall see, there are few activities more useful than these in building up the varied capacities needed for social adjustment; that is when they are used wisely as a means to an end, and not mistaken as an end in themselves. But exactly the same warning is applicable to scholastic study, which is so often mistaken by

teachers as an end, or used as the sole means of education, of which they are purely ancillary, as we shall shortly see.

Avoidance of conflicting interests. Although the principle that application to study leads to interest in that study is indisputable, yet the *affect* is very different in either of two contingencies.

First, if there is a frequent intrusion of some conflicting interest, *e. g.*, a series of suggestions tending to create dislike, a taste for the study will not grow, because of the fact that unpleasant *affects* will be associated with study itself on account of its frequent conjunction with periods of frustrated desire. Thus, if in a family, frivolous dissipations are regarded as being the highest enjoyment, it would require more fortitude than belongs to a child to maintain a solitary effort, when counteracted by suggestions from without, even if these are not explicit, that the only real enjoyment is in a type of pleasure which votes all study a bore.

Secondly, when a child is held to a task which is beyond his intellectual grasp, it is not possible that constant failure, especially followed by reproof, will create a pleasant *affect*: hence will follow distaste and a desire to terminate the task: it is the end that will be desired, and not the accomplishment.

The power of an *affective* attitude is most clearly illustrated by such an instance as a small boy allowing himself to be pinched and banged, which he very much dislikes in reality, in order to show that he is impregnable to being hurt. The explanation of this is the desire to be big and strong, and that he believes that the withstanding of pain is a quality of a big, strong boy. As physical prowess is that which has been emphasized before him, it is that which he thinks desirable. When intellectual power receives emphasis in the presence of children, they are very likely to make efforts towards that as an ideal.

A new *affective* attitude changes conduct and activities remarkably. I have under observation a child of eleven who formerly did most of the housework for her widowed mother with such acceptance as to be considered a model girl; but an entire change of disposition towards the housework was caused by an ambition to go to college. The incompatibility that she believed to exist between this desire and her work not only made her refuse housework, but unfitted her for the study by means of which she could hope to go to college, and her anxiety became concentrated upon her promotion alone.

Intellectual Opportunity. But inclination toward a particular kind of activity will bear no fruit unless the child is afforded opportunities for practice. Hundreds of tastes arise tem-

porarily in the life of every child; but their development is frustrated by lack of opportunity to exercise them to the point where they become permanent inclinations.

After all, what is called education is largely the acquisition of co-ordinated activities; for when most people speak of education, what they really mean is acquired dexterity or learning.

Movement and Mind. In order to appreciate the matter of intellectual superiority, it must be understood that there is no essential difference of principle between the training of the co-ordinated acts of the muscles known as skill, and the co-ordinated acts of the mind known as intelligence. Popular language has expressed this truth in the word "expert." Expertness is dexterity, but the word is applied to a man of special knowledge as well as to one of special skill. Thoughts are essentially movements, just as are emotions. The latter, even when signalized by no visible change of position or no visible or measurable redistribution of blood in blush or pallor, fullness or emptiness, are determinable not only introspectively by the subject, but objectively by another observer, thanks to an apparatus which records what is known as the psychogalvanic reaction. Experiments with this instrument led its users, the Swiss Psychiatrists, to infer that it was emotion which created the current which passed through the instrument when the patient's thought was influenced in certain directions. The physical source of the current was for long in doubt, until the researches of Dr. Sidis ascertained that it was due to unconscious movements of the muscles. Hence, muscular movement is a component of emotion. Now, we have as yet no means of physical measurements to prove that thought is a movement; but it is a necessary inference from all analysis of sensori-motor reactions and the storing of their impressions in memory and the conjunction of these into systems of ideas. It would take too long to recapitulate the proof of this.

Inhibition and Will. So let us assume that all thought is the expression of a series of movements neutralized by other mutually inhibitory activities, the counter action of which leads not to a direct muscular movement but to the sentiment of or the explicit expression of what we call "idea." The inhibitions and expressions may be spoken of as volitions; but they are in reality an essential attribute of the thought, will being merely a term to denote some of the tendencies during any given period. Irresolution is merely a conflict between two or more idea systems of which the tendencies counterbalance. Decision is merely a superior energizing of one of these systems by an additional factor added from

without or aroused from within. Sometimes it may be effected by the weakening of the dynamism of a conflicting idea system, either through exhaustion of the neurones by physical causes or by subtraction from the total energy of one of the constituent idea or feeling elements by some psychological influence from without.

Acquisition of expertness. But I must leave this fascinating subject to proceed with the pedagogy of expertness of the body, remembering that the principles discussed are strictly applicable to expertness of mind.

In the first place, human dexterity is of exceedingly slow growth as compared with that in an animal, for the possibilities of error are so much greater on account of the enormously greater complexity of the human brain. We know that one reaction from an impression on the nervous system facilitates a second similar reaction, and that by repetition the reaction becomes what we call habitual and very difficult to arrest. In the popular phrase "habit is second nature." A large part of the secret of successful pedagogy inheres in this principle. Both the Sidis boy and young Mill are striking examples of this truth as compared with what is the usual procedure. Even supposing that a child does show an interest in an object which furnishes thoughtful activities, it is very rare for any diligence to be shown by his guardians in forming from what little he acquires spontaneously a bridge to something more. The child himself has neither means nor experience to lead him far beyond the obvious, nor has he wisdom to persevere very long for the sake of something beyond; whereas each piece of information gained and each activity employed should be linked as soon as possible to an acquisition determined by the ostensibly superior wisdom of an elder. This is what was actually done in the cases of Sidis and young Mill. In each case, the child's acquisitions were guided by an intelligence wise enough and painstaking enough not to make the innumerable mistakes which are inflicted upon the child whose supervision is entrusted to servitors without acumen and utterly ignorant of even the first principles of the growth of the mind. Of parents themselves, how many have more than fragmentary and often misguided knowledge of these principles? And after all, the knowledge of the principles is only the first step. From them, fall to be deducted at every moment of the day and in response to every minute act of the child, an innumerable series of adaptations to guide its need in accordance with the correct principles of mental development. Even of professional teachers, how many have clear conceptions of the principles with which they are supposed to deal? Do not the majority at once take refuge in the

routine comprised in rules, methods and systems, in which a profound ignorance may be effectively concealed by mystifying phrases of the meaning of which no conception is formed?

But granted that a teacher has acquired a psychological penetration like Colonel Parker, a sympathetic insight like Froebel, an erudition like James Mill, and the biological point of view of our own scientific period, what avails it all for the production of anything like intellectual precocity; for are not the vast majority of children already utterly spoilt intellectually speaking, long before they reach such a teacher?

Would it be possible to train a virtuoso on the violin or other musical instrument were he permitted without guidance to use a violin at an early age, and by doing so to form innumerable bad habits before going to a teacher, say at the age of fourteen? We all know that it would be almost impossible. Apparent instances to the contrary have lived in a musical environment, and have acquired skill by correct imitation, with an occasional correction by a master. These cases are quite comparable to that of the Sidis boy, who acquired knowledge by imitation and occasional guidance by a master; the boy, moreover, was not held to a rigid system as was James Mill's son.

Even the comparatively coarse movements in the work of a professional gymnast cannot be properly learned unless a person is apprenticed as a very young child.

Now it is easier to play at gymnastics or with a musical instrument than with the mind, as Hamlet declared; and yet while we do not for a moment expect great dexterity to be acquired except by the most carefully guided training, and that in early childhood, and would not ever dream of permitting a pupil to utilize his leisure in practicing a method which could only lead to bad habits, yet we do not dream of preventing a child's practice in habits of inattention, untidiness, inaccuracy of observation, errors of fact, want of system, any one of which will seriously vitiate his future mental powers unless it is corrected by future efforts. Even then it can never be completely eradicated, and will remain as a drag upon his later endeavors, besides consuming an enormous amount of energy and time while it is being overcome. The spare energy of the properly guided child goes entirely into the acquisition of mental skill for direct use, and has not to be wasted in self discipline to correct erroneous thoughts and ways.

The learning of speech habits as illustration. This principle is perhaps best shown in the learning of speech; for this is so quickly and easily appreciable by others. Every one knows how difficult it is to correct in after life an unpleasant inflection acquired in youth; and yet with what apparent ease

and rapidity does not a child acquire the opportunity of imitating good models, and is assisted by a little guidance at appropriate moments.

Now, articulate speech is only one of the specialized functions comprised among the foundations of intelligence; and it should not be difficult to apply to the intelligence as a whole the data so easily ascertainable by the study of defects of expression in speech.

For instance, what is easier than for a child to pick up undesirable words? How easy it is to eradicate these if the process is begun at the first utterance of the word; but after a few weeks how difficult does it not become.¹ Even in the articulation of words, a wrong use of the muscles is very easy to adjust at the beginning, and becomes more difficult as time goes on. The comfortable doctrine that inconvenient habits and mental inefficiency are appanages of a child, and have nothing to do with his teachers or environment, has very restricted application.

A Pathological example: its cure. For instance, while in Paris, I was asked to see the five-year-old son of a musician who was much concerned by the defective articulation of his boy, which his mother thought was natural and would be out grown. What she meant by natural, I do not know; as no one else in the family had defective speech. After an examination, I concluded that the boy, who was very inattentive and distractable, had been permitted to go on using his infantile manner of articulation, which is often so vague and ill-formed. I believed that re-education could remove the defect, and imposed articulatory exercises to be given by his mother. After two weeks, there was no improvement whatever; but I had sufficient confidence in this diagnosis to request the father himself to sacrifice half an hour of his very busy day for carrying out the exercises, as I had not a high opinion of his wife's intelligence or perseverance. As a result, the boy spoke as well as other children after less than four months of re-education. So much for the facile acceptance of slovenliness and inefficiency as a normal quality of young children.

¹The physical universe supplies us with material where the use of language can be rendered exact. Thus, a fluid is a definite concept clearly appreciated by the senses of a child; a cylinder has an unequivocal shape which the child can appreciate; a pure sound is of measurable pitch. And although hardness and softness are relative, as are heat and cold, each may be measured in terms of some arbitrary standard known to the child. By the neglect of precision in such simple matters as these, parents miss the best occasion for imbuing the child with a love of accuracy and order which would go far to minimize his future difficulties and make profitable his studies in school.

The materials for the instruction of thought: concrete physical phenomena. From correct habits of speech, it is only a step to correct habits of thought. The insistent claims of the physical universe upon the understanding of a small child should be satisfied by putting him in the way of gaining accurate knowledge and not, as has been the fashion, by putting him off with fairy tales or intentional deceptions. Instead of distracting his attention, we should maintain it upon such questions. This is the easiest and most obvious matter upon which to train habits of intellectual application, powers of observation, and to begin the study of inference and reason: this is science, the easiest road to education. But that it can be done even apart from objective nature has been shown by James Mill, whose training of his boy was purely literary.

Science or Classics. The instances of young Sidis and Mill contrast completely as regards the subject matter with which they were educated; but they concord perfectly as regards the principles at work. This consideration answers the perpetual controversy as to the relative merits of the classical and modern subjects in education. It is not the subject, but the method (in the deeper sense) which counts. The Latin fathers said "learn much, not many things." Intensity is preferable to diversity, as the success of the Scott shows.

As education is acquisition of habits, it follows that it must be good or bad only in accordance with the place of the acquisition in social esteem. Thus, a thief may be highly educated as such; but his attainment is not regarded as desirable. The ability needed for a successful gambler in stock manipulations might have been of service used in another field.

Such perversions of human intellect would not occur were trainers to act on the principle that human energies must have vent, and to provide opportunity for the exercise of those of the child. Naughtiness is the fault of the parent always. It merely connotes the expression of the child's energies otherwise denied outlet.

The channeling of energies. Hence the channeling of that energy is an important principle to remember. Give him the tools and material, and guide his use of them; then "naughtiness" will be at a minimum. The conjunctions of experiences and materials, the employment of which we call inventiveness, will of course create situations incommoding to those who relate them differently; but such inconveniences should not cause scolding nor repression. The new act should be placed before the child in its true relation to nature and to society, and a lesson gained in this way.

As the tree is bent so will it grow; but be sure that you know

which way you are bending. An unsympathetic guidance breeds concealment. Again has psychopathology come to our aid in exhibiting the latent thoughts which guide the lives of misunderstood children. The rectification of such misunderstanding is well shown in the work of juvenile courts, superficial and imperfect as they must needs be.

In a more fine and profound way the book of Eleanor Davids illustrates the facility with which the young tree is re-shaped. She took a boy of five years from an orphan asylum, and in one year taught him truthfulness, accuracy, attention and tidiness, and through self-respect made him into a well-doing little gentleman. He was a quite ordinary child, with no special gifts. Likewise did Fenelon.

The Problem. This leads me to the question in which you are most of all interested. Can John Stuart Mill or Sidis be reproduced in any family?

I will say, as did Oliver Wendell Holmes. Yes! if you begin with the grandfather; and here I do not speak altogether of heredity; but of attainment and atmosphere.

Mill and Sidis were possible on account of their fathers' training. Had they been neglected as is the average child, should we have had them?

But to train a child so, one must oneself be trained. Hence the need of a grandfather. Besides, one's whole attitude towards life and its meaning must be rationalistic. It is significant that neither Mill or Sidis were followers of current theological creeds. Each thought for himself. We have the benefit now of their doctrines and experience.

But doctrine must be applied. Rousseau, for example, possessed many of the notions of which we have spoken; but his absorption in his own pursuits left no time for the education of his children, whose neglect by him is a by-word. Again, no one more devout than Fenelon had charge of the education of a boy; and yet the sagacity and wisdom of the young Prince of Bourbon was the admiration of his day, save in some few matters of conduct, in which perhaps he was more sinned against than sinning. It must be remembered that Fenelon had to deal with a Royal Prince who had been utterly spoiled by injudicious adulation of women of the Court. Besides, Fenelon himself had a strong rationalistic tendency, and was a man of strong personal convictions, as the Quietest controversy showed. In addition to this, he was a man of profound psychological insight, as was revealed by some of his letters to the troubled souls who consulted him.

Need of care of the body. A factor in intellectual capacity which too often is left to pure chance is that of a fit

body.¹ Its neglect has led to the early death of geniuses like Chopin, Mozart, Keats, etc. In young Mill, the factor was duly secured by the daily walks upon which his father insisted and by the long Sunday outings which were substituted for the attendance at Church, which in those days it was most exceptional to refuse. The Sidis boy, too, has been kept strong and vigorous.

Included in the principles of physical efficiency is that of not working when tired and work is felt to be ungrateful for that reason. It is not possible to cultivate intensity as a habit in intellectual work if there is a constant struggle with fatigue or sluggish action of the neurones, on account of bodily disorder. If it is attempted, one of two things will happen. Either the energies will be utilized by the brain, in which case the nutritive processes will suffer, and the child will grow up either enfeebled or unsound; or else the insistent demands of nutrition will shut out from the brain pabulum and energy it requires for work, and the consequence will be easy-going and slovenly thinking and an incapacity to perform mental operations requiring much effort, a habit which when once acquired can be shaken off only by persevering effort.

Hence, the greatest watchfulness should be exercised in order to ensure a child's attempting the more difficult of his tasks at a time when his energies are at the highest level, and to avoid imposing tasks which require great concentration and effort at a time when the child is jaded or below par. Mere unwillingness or disinclination to apply itself is, however, no criterion of incapacity. Indeed, a wandering of attention is very often an index of superabundant energy. It is at just such a time that a child has the greatest need of the direction and maintenance of his attention in a fixed channel designed by a wise tutor. After a few moments the wandering attention becomes fixed upon the end sought, and a fruitful lesson can be achieved. Each successful attempt to engage attention makes another easier, partly because of the instinctive desire to do again that which was before agreeable, and partly because of the actual interest which the subject of study itself has aroused.

¹During training, proper diet is in most cases essential, and this so in proportion as the functions of animal life are less insistent, as is sometimes the case in an intellectual stock. Stability of mind is hard to obtain when frequently assailed by disordered blood arising from digestive disturbance; and when circulatory energies are diverted to coping with improper or excessive food, good mental work is impossible. For example, there is described in Germany a distinct type of impediment of speech made possible by the excessive amount of meat and eggs consumed by some children; and it is not possible to cure the stammer until the tremendous obstacle of this faulty diet is removed from the patient.

Drudgery. There are always some necessary acquisitions which in themselves have only a faint interest, especially when taught without the child's appreciating their significance. An example in point is the multiplication table. In these cases, perhaps the best incentives, in the absence of interest, are pleasure in accomplishment for its own sake, and the liking for approval. This latter played a large part in the education of young Mill; and the Sidis boy was exceedingly proud of his ability to perform some of his tasks. It is unfortunately too often the case that this sentiment is permitted to usurp the place of interest in the work itself. Every one must know of instances where the desire for prizes or praise robbed study of all meaning. It was a very subsidiary feeling on the part of young Mill; for his father took the greatest care to catechise him, as far as his powers went, regarding the meaning of every thing he learnt.

So called "General" intellectual discipline. I am not contending that intellectual exercise in one sphere necessarily results in general increase of the intellectual power. The now well-known researches of Thorndike and others have disproved that there is any *marked* influence of special forms of training upon more general abilities. For instance, doubling the reasoning power in arithmetic does not double it in grammar, chess, economic history or theories of evolution. Tripling accuracy of movement in finger exercises does not triple it in typewriting, billiards, painting. Courage gained by playing football does not connote an equal gain of courage in tackling intellectual difficulty or facing moral situations.

That there is some gain in these contingencies is contended by Thorndike to be due to the increased efficiency of that function which is common to any two activities compared. For instance, improvement in adding figures improves one's ability to multiply them only because multiplication is in part identical with addition, and because each has in common the same kind of eye movements and focussing the attention upon the relation of the figures. Again, any mental process which exercises by reassociation such facts of experience as length, color, form, etc., will be of value in any other intellectual process demanding the same substrata.

The necessary relationships of subject of study are exceedingly few. Thus, experiment shows that the power of remembering numbers has no necessary relation with that of remembering words. Still more strikingly, it does not even follow that improvement in adding 5, 7, 4, procures the same improvement in adding 4, 5, 7.

Need I then expand the corollary that attentiveness in

school work does not necessarily bring attentiveness to business, mechanical or social matters.

There is, however, a factor common to every sustained activity. I refer to the physical basis for prolonged concentration. The tendency towards movement is instinctive. The substitution for this of an ordered activity during which diverse movements are inhibited in order that the energy may concentrate upon a selected series of movements and inhibitions, is very galling at first. It is expressed by fidgeting. Now, this difficulty depends upon distribution of the blood in the body and the state of the secretions. By training, not only is tolerance of discomfort gained; but the digestive, circulatory and nutritional functions become adapted to methods of existence at first repugnant. It is in this way that the concentrated effort required in the intellectual training upon any one subject of study creates a general *habitus* or disposition which makes it more easy to accomplish any other concentration upon intellectual study, and this perhaps quite apart from the actively agreeable *feeling-tones* excited by the more purely intellectual element of study.

It is my belief that the significance of this factor has been scarcely appreciated by Thorndike and his followers; but to the physiologist it is of tremendous importance in explaining the conditions which make for intellectual precocity. But it must be manifest from the earlier part of this paper that *learning to like to think* is of extreme importance in the attainment of the genius known as precocity. Genius itself may be regarded as consisting of the power to maintain at the same time in the mind many impressions and to relate the complexities of these into a generality. It is largely a matter of energy and its direction. It is in its first steps necessarily a capacity for taking pains, as Carlyle said.

Theory and sentiment to conform to a supposed phylogenetic succession. It is to be noted that neither in Mill nor in Sidis was there any conformity to the Spencerian principle, which has become so rife in our day, that a child's activities should develop in the same order as that in which civilized man has progressed. Methods, deduced from this assumption of doctrinaires, have led to alterations of educational curricula nothing less than weird. The doctrine, I believe, is largely based upon a false analogy from the phylogenetic succession shown by the embryo; and I believe it to be in the main misleading; for a modern child of eight, although markedly inferior to the lowest of savages in many fields of accomplishment, may yet far transcend him in others without any detriment to the development of his powers in after life.

The "dynamic" factor in education. But implicit in the

doctrine of phylogenetic succession is an important principle of great value. I refer to the dynamic factor of effective education, which Professor O'Shea has so lucidly developed; and he has, moreover, avoided a common error of divorcing manual training from the life interest of a child by giving him uninteresting tasks under the idea that the pedagogue's notions of logical succession as regards complexity best conform to the child's capacity. But they have ignored the *affective* attitude of the child towards his task, which we have found to be so important. Without an end in view, a task is utterly wearisome if often repeated; and in the small child, the end must be immediate in proportion to his poverty of intellect.

Motor Education is a great Teacher of Inhibition. This principle has been adopted and has to an extent already entered scholastic education in America; and I need not enlarge upon its methods, now widely known, save to indicate the pitfalls led to by its erroneous application. It is significant that Mill had no manual training whatever, and later in life somewhat deplored his own want of skill in the use of his hands. But this was more than made up by the control he gained through intellectual drill, in which the motor element is represented by speech and writing. Similarly, the voluntary power and social adaptability of Mill were gained without any of the manual activities which the theory of phylogenetic succession would demand.

It has been too much forgotten by the philosophers of educational theory that the average person does not think as they do. Long practice in generalization and deduction has caused them to divide phenomena after a logical scheme. The average man has not this need. Even "practical business men" selected for their executive ability are incapable of judgment without concrete presentations. This statement may astonish; but it is a direct quotation from the experience of the director of the largest and most successful organization for scientific research in the world. The statement has been independently made to me also by the director of the scientific researches of one of the arms of the Federal Service.

The real principle at work, then, is not phylogenetic succession; but the exercise of sensori-motor activities in any fashion which will maintain the *affective* attitude of liking by which further activity is stimulated. And as inertia and perversion of taste have each a thousand avenues of approach, intelligent direction of the child's activity towards a clear object is usually essential for the intellectual development which we call precocious.

LITERATURE.

Wandtafeln zur Schulhygiene zum Gebrauch bei Vorlesungen und Vorträgen;
1.05 x 1.44 M von Regierungsrat PROFESSOR DR. LEO BURGERSTEIN,
Privatdozenten an der K. K. Universität Wien. Published by the
K. K. Schulbücher-Verlag, Wien, 1910. Six charts at 2 K. 10 h.
each; or 20 heller per set.

Chart "A." Morbidity, growth in weight and height, study period and sleep.

Chart "B." Influence of season upon resistance to disease and upon growth.

Chart "C." Influence of afternoon sessions on morbidity and voluntary attention.

Chart No. 1, Water Supply; Chart No. 2, Ventilation; Chart No. 3, Heating.

Chart "A." Key of Stockholm investigated morbidity, increase in height and weight, study periods and sleep in the High School pupils of Sweden. He utilized the method of Hertel of Copenhagen. The data secured came from over eleven thousand pupils. The details of this investigation are here charted by Burgerstein. He shows in figure No. 1, Chart "A," among other things, that the percentage of morbidity increases up to fourteen years of age and then decreases up to seventeen years, and then increases to the end of the high school period. He states that these curves may be accepted as representing not only conditions existing in Sweden but conditions as they exist generally; and that the requirements of school work should take into consideration the natural fluctuations of the resistance of the individual against permanently harmful influences and that special care should be taken in arranging school work to prevent the increase of morbidity during the prepubescent period.

Figure Two Chart "A," shows that the total working period (recitation and study) among the Swedish children investigated by Key is on the average almost seven hours a day for eleven-year-old pupils, and is over eleven hours daily for the pupils in the highest classical and scientific classes; and that, throughout, the average periods of sleep are more than one hour too short — "nine hours for pupils eleven years old, and seven hours for pupils nineteen years old." These conditions are admitted to be local, but Burgerstein points out the fact that scanty local reports made in other countries lead one to assume that the total day's work is frequently too much and the amount of sleep is frequently too little.

The text under Chart "A" further brings out general additional interesting facts. First, in general the pupils in Key's investigation who worked in excess of the average number of hours daily showed a higher morbidity by 3.2% than those pupils who worked less than the average number of hours. (In Stockholm this difference was 5.2%) Second, the pupils who spent less than the average amount of time in home study included 52.2% of those pupils who had difficulty in keeping up with their classes. The pupils who work overtime appear to be the more capable pupils. The text states that Key found that only those pupils get enough sleep who sit in classes that are considerably lower than the class prescribed for their ages.

The text on Chart "A" contains a bibliography with eight references.

Chart "B." This chart is made up of three parts. (1) A dotted curve represents the admissions by months to five hospitals for children in Vienna for the years from 1898 to 1904, and covers 40,144 cases in total. (2) A heavy lined curve represents the absences by months from school in a small Austrian city. The pupils were between eleven and fifteen years of age.

The curve of morbidity is based on hospital returns for children of both sexes between the ages of 0 and 14 years who came from the poorer classes in a large city. The curve for absences is based on returns from pupils between the ages of eleven and fifteen coming from better homes, and attending boys' schools in a small city. In spite of the variety of conditions concerned both curves show from a hygienic point of view, unfavorable periods of the year for Central Europe. The greatest number of admissions to the children's hospitals and the greatest number of absences from school occurred near the end of the calendar year and during March and April.

(3) The third set of facts presented in Chart "B" refer to the variations in gains in weight in a group of one hundred girls observed by Hanssen. These girls were from six to sixteen years old. They were weighed once each quarter for five years. The results of these observations are plotted on the chart and show that the greatest gains came during July and August, the vacation period, and that the gains decreased from September to June in the school period. These facts are taken to indicate a need for a vacation during the month of December and another in March or April.

Chart "C." Figure One in Chart "C" presents the results of the investigations of Schmidt-Monnard of Halle upon several thousand boys and girls in middle class schools. The figure shows that anemia, habitual headache, nervousness, insomnia, lack of appetite, etc., were more common among children with afternoon sessions than with children with morning sessions. These complaints were generally more common among the girls than among the boys.

Figure Two in Chart "C" illustrates the result of Schuyten's observations in the public schools of Antwerp. These observations were made daily and cover over six hundred children between the ages of seven and fourteen years for a period of two years. They indicate that the percentage of cases showing voluntary attention was greater in the morning sessions than in the afternoon sessions, save in May, June and July. During these months the noon hour is more favorable for recreation and play. Schuyten regards this as an explanation for the increased afternoon attention in May, June and July.

Chart One. This chart deals with the arrangement of wells, arrangements for drinking, details of construction and individual cups.

Chart Two. The figures in this chart illustrate a commercial ventilator; the utilization of windows and doors for ventilation in the school; arrangements for cleaning and filtering the air; ventilation of streams of air directed from natural wind currents by scoops through pipes.

Chart Three. The figures on this chart deal with warm water heating systems, low pressure steam heat systems, and gas heat.

THOMAS A. STOREY.

Vocational Guidance of Youth, by MEYER BLOOMFIELD. Houghton Mifflin & Co., pp. 124.

This book, with an introduction by Prof. Hanus, is a brief survey of what is being and may be done along this line. Perhaps the most vital question of to-day is how far the work our children turn to is the result of choice, accident or necessity. Society has not realized that successful choice of a life work is not possible to the unadvised and unprepared, and that it is not conserving the talents of the poor or of the majority of its children. This is stated, however, in the Report of the English Royal Commission on Poor Laws and Distress: "We cannot believe that the nation can long

persist in ignoring the fact that the unemployed and particularly the under-employed and unemployable are thus being daily created under our eyes out of bright young lives, capable of better things, for whose training we make no provision."

Now evidently adequate training and systematic counselling at the time of leaving school would afford much relief, and in doing this, the need that the public school shall give better training and guidance and that industry shall itself become educational both are forced into prominence. Just as schools must be made more efficient, so must occupations be evaluated, and prevented from abusing and misapplying youth.

The beginning of vocational guidance was made in Boston about three years ago under Prof. Frank Parsons, and in 1909 the School Committee entered into co-operation with his Bureau. After his death Mr. Bloomfield took charge of the work. The Bureau has stimulated or arranged for vocational lectures to graduating classes, has given a Normal Course for teachers wishing to take up the work, keeps a vocational card record of all graduating students, and is making a careful study of opportunities in Boston. The Girls' Trade Education League and the Home and School Association emphasize respectively vocations for girls and the parents' interests, both co-operating with the Vocation Bureau.

The Vocation Bureau puts into the hands of teachers the results of its investigations into vocations for Boston boys, on the basis of which the teachers can more effectively advise the boys.

Brief reference is made to work already done or being done in Germany, Scotland, England, as well as that in progress in New York City.

Such work demands first of all a vocational counsellor, who must have unusual qualifications of tact, persistence and enthusiasm, since he must co-operate at once with the business man, labor union, teacher, parent, pupil, and at times with all the social agencies of the place. Further, he should not only have academic training, but a knowledge of the conditions of industry, preferably at first hand, in his own town. He must have the pupils inspected for mental and physical defects, but at the present stage of mental tests, few or none of them are useful. He must also be able to refer young people to vocational literature. But he must resist the temptation to become an employment agency, must not be prejudiced for or against certain lines of work, must never lose the personal touch. Those types of applicants who seek occult assistance will usually need special treatment, and in all cases applicants will need much assistance in their self analysis, no matter how good their spirit of co-operation. But while such guidance is not a panacea, and has its own dangers, it does point towards the firm establishment of a "life career motive," to a conception of "working life as continuing education," which alone can "appease the God-given hungers of youth."

A cyclopedia of education, edited by Paul Monroe, with the assistance of departmental editors and more than one thousand individual contributors. Vol. 1. N. Y., Macmillan, 1911. 654 p.

This work is the result of the co-operative efforts of several hundred specialists who have contributed the results of their study to the systematizing of educational ideas and practices. A spirit of loyalty to their profession and a scholarly interest in the attempt to give a more definite scientific basis to the work of the teachers have been the dominating motives. No encyclopedia beginning to approach this has ever appeared in English, although similar ones have existed in other languages. The work represents the product of long investigation on the part of most of the contributors and is the outcome of years of special effort on the part of the editors. The character of educational literature is now vast and varied and so are educational ideas and practices. Moreover, education has an increasing importance as the school is coming to be more and more of a social institu-

tion and the numerical strength of the teaching profession is being rapidly increased. The publisher's announcement of the last year gives a list of 348 new works on education out of a total of 8,745 new books issued in the United States; in England, the ratio of 587 to 8,446, in Germany, 4,203 to 30,317; in France, 1,005 to 1,805. During this time, the educational periodicals issued in the United States number 150. It is high time that this vast and growing literature be brought together and it is no less than this stupendous task that the editors of this cyclopedia have attempted. We shall hope to print fuller notice of their work later.

L'education commune á Buenos Aires, par PABLO A. PIZZURNO. République Argentine, Extrait du Recensement Général d'Education Levé le 23 Mai, 1909. Ateliers du Bureau Météorologique Argentin, Buenos Ayres, 1910. 87 p.

This report on the public schools of Buenos Ayres shows not only rapid progress in the development of the schools of that city during the last ten years but hopeful signs for the future, for not only are existing defects clearly recognized but suggestions looking towards their removal are made. Many modern pedagogical improvements have already been adopted and still others are under consideration. School attendance is compulsory for six years and there is a six grade course of which pupils are expected under normal conditions to complete one grade a year. Special classes are provided for children who are defective either mentally or physically. The minimum age of entrance is six years though many enter at seven or eight, or even nine years. It has been found that those entering at six years often remain two and sometimes three years in the first grade. In order to remedy this it is proposed to raise the age of entrance to seven years. There is an excellent system of medical inspection, and hygiene occupies a prominent place in the curriculum. The instruction is practical and carried out in the routine of the school. The school session is four hours and physical exercises are a part of the curriculum and occupy a twenty-five minute period, which is placed as nearly as possible in the middle of the session and there is a ten minutes interval after each fifty minute period, which is usually occupied by two classes. Many classes are held in the open air, the climate favoring this arrangement. Playgrounds are provided and supervised by the teachers and a plan for the establishment of school baths is under consideration. A novel and admirable feature which is being introduced as fast as possible, and is already established in a few schools, is a course on the care of infants and young children for the fifth and sixth grades, "that the school may give to the fathers and mothers of the future the necessary training for the most common and urgent needs of life." The present difficulty is the lack of training among the teachers for such a course and the supervisor recommends that in future all teachers for these grades should be given special instruction by a member of the Medical Council of the Schools. Manual training, domestic economy, civic and moral training are all given prominent places in the curriculum and method of teaching closely approximates the German system, mere lesson setting and reciting being absolutely forbidden and the time in class being given to active instruction and interchange of ideas between pupil and teacher. While the same conditions as to the difficulty of securing adequately trained teachers exist in Buenos Ayres as elsewhere, the normal schools which exist are excellently equipped. They are of two classes, one having a four and the other a six years course, to which girls are admitted at fifteen and boys at sixteen years, the former training for the higher positions. A teacher's tenure of office is secure, as long as mental and physical fitness are unimpaired and promotion is based on both ability and term of service. Salaries range from \$300 to \$160 per month for the nine months of the school year and there is a system of honorary titles and retiring pensions. Teachers retiring after 25 years of service at the age of forty-five, receive

95% of the average of the salary received during the last five years. For those retiring after 17 years of service the pension is calculated by multiplying 3% of the last year's salary by the number of years of service and this same basis holds for those retiring at any time on account of physical disability. A proposition to affiliate the public libraries more closely with the schools in a way to greatly increase the usefulness of both was unanimously adopted by the *Congrès des bibliothèques* held in May, 1910.

THEODATE L. SMITH.

Idealism in education, or first principles in the making of men and women, by HERMAN HARRELL HORNE. N. Y., Macmillan Co., 1910. 83 p.

The problem of education is man-making. The author discusses its relation to heredity, environment, to will, and then takes up the philosophy of man-making. He apparently has almost no knowledge of educational movements outside our own country and it would seem from his references in the various chapters that his reading here has been uniquely restricted. His point of view seems to the writer provincial, narrow and prejudiced. He touches a great many questions but superficially and lightly. Indeed, does not the very sub-title of this book, "First principles in the making of men and women" betray an apprentice's hand?

Auf Deutschlands hohen Schulen, von R. FICK. Hans Ludwig Thilo, Berlin, 1900. 480 p.

This is an illustrated culture history of the German universities with special reference to student life and customs. It abounds in illustrations of ancient modes of hazing, duelling, buildings, excursions, decorations with degrees, tells how students of the Middle Ages lived, studied, dressed, fought, courted, caroused, banqueted, took their exercises, gave concerts, etc. Many of the illustrations are of academic buildings and the work ends with an excellent bibliography.

Problems of the elementary school, by ARTHUR C. PERRY, JR. D. Appleton & Co., N. Y., 1910. 224 p.

The problems of organization are the organic structure, curriculum and moral teaching. Problems in method and management are English in the upper grades, history, facts and devices in arithmetic, blackboard, school, museum, alumni, the adolescent girl. The fullest treatment is that given to arithmetic. I cannot, however, feel that the author has shed a great deal of new light upon the subject.

Class teaching and management, by WILLIAM ESTABROOK CHANCELLOR. Harper & Brothers, N. Y., 1910. 343 p.

The writer first discusses the learning and teaching process; development teaching; the teacher as interpreter of the course of study; the day's work and plan; class control; classifying, marking, grading, promoting; how to make a good school and class; the class teacher and industrial arts; the teacher's own life in an age of educational expansion.

A text book in the principles of education, by ERNEST NORTON HENDERSON. N. Y., Macmillan, 1910. 593 p.

In the first part the author treats of education as a factor in organic and social evolution, dealing with readjustments in meanings, conceptions, methods, discussing the relation between education, heredity and society. The second part is devoted to progress of education in the individual, touching individual development generally, recapitulation, trial and error, conscious learning, training of the reason, formal discipline, imitation, language and play. Part three is devoted to educational agencies, dealing with evolution of the school, its function, the academic and practical, liberal and vocational ideas.

Some aspects of modern education, compiled by R. D. Patel. Surat, India, I. P. Mission Press, 1910. 148 p.

This is an interesting collection of opinions on various educational topics from those dealing with the elementary school to the university that are thought vital in present conditions of education in India. There is special interest in the chapters on the moral and the religious crisis, which seems to be a grave one in this country at present. The problem of literature in the competition between that which is indigenous and English literature are unique.

Principles and methods of university reform. Report of the Hebdomadal Council. Oxford, Clarendon Press, 1910. 98 p.

This valuable report covers the following points: the constitution of university, faculty with draught statute, compulsory Greek, entrance examinations, admission of poor students, finance, scholarships, exhibitions, fellowships, curriculum for business careers, and the length of the academic course. As a whole the report marks the high water mark of British university reform.

Educational aims and efforts, 1880-1910. By SIR PHILIP MAGNUS. New York, Longmans, Green, 1910. 288 p.

This English veteran here prints many of his addresses on secondary, university and technical education.

Proceedings of the Child Conference for Research and Welfare, 1910. Held at Clark University, Worcester, Mass., June 8-July 2, 1910. New York, G. E. Stechert & Co., 1910. 287 p.

Clark University here prints the proceedings of its second Child Conference for Research and Welfare, a five days' session, with thirty-five addresses by nearly as many different experts on such topics as home education, the children's clinic at Clark, the play life of girls, application of psychology to the child welfare institutions, duty of the community to the neglected child, child nurture in Catholic schools, the problems of the reform school, industrial insurance and its relations to child welfare, the motion picture, birth registration and the prevention of infant mortality, European suggestions in school hygiene, the discipline of work, the child labor committee, the proposed national children's bureau, the tuberculous child, open air schools, eugenics and venereal diseases, improving the race, the hook worm disease among children, the probation system, parental responsibility, and defective and delinquent childhood, children and birds, school gardens, the Worcester conference, a comprehensive plan for child welfare, vital statistics.

Open air crusaders. A report of the Elizabeth McCormick open air school together with a general account of open air school work in Chicago and a chapter on school ventilation. Edited by Sherman C. Kingsly. Chicago, 51 La Salle St., United Charities of Chicago, 1910. 107 p.

This is by far the best book up to date known to the writer on open air schools. It has chapters by different writers on history, details of management, statistics, comments, the open school window, ventilation, etc., with half a dozen charts and more than a score of illustrations, and an excellent bibliography at the end. One of the best tables shows the methods and results of open air schools in eight American cities.

The modern child, compiled by Hervey Elwes Foulis, London, 1908. 246 p.

This little volume is a selection of extracts, rather more prose than poetry, from various modern authors, several score in number, about the child. They are grouped under the general captions: childhood, parents, babies, the nursery people, naughtiness, frightening things, little girls,

boys, grown-ups, lessons, out-of-doors, little invalids, seaside children, religion, entertainments, London, children's books, Christmas, lost awhile. The selections seem admirable. The compiler is evidently a very discriminating lover of childhood.

Psychologie de l'enfant et pédagogie expérimentale, by ED. CLAPAREDE. Fourth edition. Geneva, 1911. pp. 453.

The first chapter contains a thirty page summary with bibliography, of the development of experimental pedagogy in Europe and this country, which is necessarily rather incomplete. Then follow equally brief chapters on problems and methods, 150 pages on the general topic of mental development, and 160 on intellectual fatigue. With this distribution of space the treatment is one sided and leaves the reader with scarcely a glimpse at some of the important phases of the subject.

The health index of children, by ERNEST BRYANT HOAG. San Francisco, Whitaker & Ray-Wiggin Co., 1910. 188 p.]

The writer, who has been a medical officer in the Berkeley, Cal., schools for years, here summarizes his experience so that it will be easily accessible to teachers and parents. He gives tables of the symptoms of the common diseases, succinct statements of the importance of treating adenoids, bad teeth, eyes, ears, etc., common nervous troubles, bad posture, defects in the feet, and so on. He also describes the office system used in Berkeley with the various blanks, and the leaflets which are sent out to parents to instruct them as to the common symptoms of disease. At the end are brief bibliographies.

The book does not assume to be a complete account of the subject, but is very well adapted for its purpose as a handbook for the teacher to use daily in the schoolroom. It will greatly facilitate her work and make it easier to introduce medical inspection in small places where medical officers must be few and poorly paid.

AMY E. TANNER.

First measures needed for child welfare upon the part of municipal and educational authorities in the South, by DAVID SPENCE HILL. Southern Medical Jour., Jan., 1911. pp. 99-104.

In this address, delivered before the joint meeting of the Southern Society for Philosophy and Psychology and the Child Study Department of the Southern Educational Association, Dr. Hill calls attention to the great need of arousing public interest in child welfare. In addition to making use of the daily press and political strategy, he urges compulsory medical inspection of all school children and schoolhouses and the establishment of a children's bureau as a part of the State Board of Education.

Colonies de vacances et oeuvres du grand air en France et à l'étranger, par EUGÈNE PLANTET et ARTHUR DELPY. Paris, Hachette, 1910. 510 p.

This is the most comprehensive treatise on vacation colonies that has yet appeared. It is confined mainly to France but gives some account of every important movement in this direction throughout the entire republic. This seems to indicate that France is far in advance of all other countries in this respect.

The guild of play book of festival and dance, by G. T. KIMMINS. Dances arranged by M. H. Woolnoth. Part 2. London, J. Curwen & Sons, 1909. 57 p.

The guild of play book of national dances, by G. T. KIMMINS. Dances arranged by M. H. Woolnoth. Part 3. London, J. Curwen & Sons, 1910. 82 p.

In these guild of play books, of which now three have been published, the effort is made to develop a system of practical study of national dances and songs, very often with words, which shall be acted or danced out with

specific directions for every measure. One volume is a book of dances suitable for pageants. The design is to bring out the child's inheritance from his remote ancestry so that all parts of the soul and body shall be exercised. The dances are designed chiefly for out of doors and with their copious illustrations, these books make very entertaining reading.

Applied ideals in work with boys, by C. WARD CRAMPTON, WINFIELD S. HALL, G. WALTER FISKE, EDGAR M. ROBINSON, THEODORE G. SOARES, WALTER M. WOOD, ERNEST THOMPSON SETON, M. D. CRACKEL, GEORGE S. ADDAMS, E. E. BOHNER, CHARLES R. TOWSON. Y. M. C. A. Press, N. Y., 1910. 256 p.

This little work treats of physiological grouping, adolescent psychology, self-government, sex instruction, altruism, boys' religion, Bible made real, the outrage in the community, the boy scouts, summer activities, helping unfortunate boys, the boy of foreign parentage and the employer of boys.

The problem of the crippled school child. An account of the treatment of crippled school-children in a residential school. By E. D. TELFORD. London, Sherratt & Hughes, 1910. 32 p.

This is a practical pamphlet dealing with the aim of the residential school for crippled children, choice of cases, residential school, the Swinton home school, cost, results, dietary, income and expenditure. It describes a progressive institution.

The baby, by DANIEL ROLLINS BROWN. Boston, Whitcomb & Barrows, 1908. 200 p.

This is an attractive compend treating the period of infancy, the new born babe, the elements of food and digestion, lactation, substitute food and feeding, wet nurses, weaning, the second year, premature infants, sleep, clothing, exercise, bathing, teething, disease, infantile ailments, pregnancy and convalescence from childbirth.

Kinderarbeit und Kinderschutz in der Schweiz, von PH. ZINSLI. SCHEIFLIN. Spring et Cie. Bern. 17 p.

This, as its title indicates, is a succinct statement of what is done for children, especially the delinquent, defective and dependent classes of the various cities of Switzerland which, be it remarked, is among the foremost countries in this work.

The diseases of infancy and childhood; designed for the use of students and practitioners of medicine, by HENRY K. POLIK. 3d ed., rev. and enl. N. Y., Lea & Febiger. 1910. 944 p.

The third edition of a very valuable and favorably known work, revised to date, with new matter and considerable reconstruction.

Plain facts on sex hygiene, by WILLIAM LEE HOWARD. Edward J. Clode, N. Y., 1910. 171 p.

The chapter heads are: conditions that menace homes and children, what are these diseases; how are they contracted by the innocent; syphilis, its contagiousness and danger to youth; hereditary syphilis; the ghosts of syphilis; mental and nervous troubles appearing late in life; syphilis in relation to marriage; the mental and physical value of continence. The author writes with his usual clear and incisive style.

The strength of being clean; a study of the quest for unearned happiness. By DAVID STARR JORDAN. Boston, American Unitarian Association, n. d. 45 p.

This is a Red Cross address, in which this versatile and always suggestive author gives us his ideas on indolence, gambling, licentiousness, profanity, intemperance, and the joy of life generally. Emotional

excess, he says quoting Miss Call, is woman's form of drunkenness, and nervous prostration is her delirium tremens. Sham emotions, whether they be of love, religion or liquor, are sensuous. Civilization has been called a disease of the nerves. Its methods in the hands of the incompetent are edged tools handled by fools.

The dawn of character. A study of child life. By EDITH E. READ MUMFORD. London, Longmans, Green & Co., 1910. 225 p.

The author seeks to interpret the child's experiences from its own point of view, pleads for a closer study of child life, describes the contents of the child's mind and its growth, together with that of the imagination, emphasizes habit, the will and its development and training, the place of punishment, takes the case of law versus freedom, stresses children's curiosity and the dawn of religion, points out how many different types of childhood there are, and on this basis seeks to draw certain conclusions that will shed light on the child's point of view. As a whole the book is well meant and timely. The author is evidently tactful and observant but there is no indication that she is even aware of the existence of the scores and hundreds of special studies touching nearly every essential point that she treats. To our knowledge of paidology the book, therefore, adds nothing whatever but it no doubt has a place and will do good.

The essentials of character. A practical study of the aim of moral education, by EDWARD O. SISSON. New York, Macmillan, 1910. 214 p.

This book is written in the belief that a clear comprehension of what really makes up human character would be one of the first and best aids to the actual worker. The author first considers natural tendencies, then how to treat them, and discusses in the later chapters disposition, habits, tastes, personal ideals, conscience, social ideals, strength of character, religion, and cultivation of character.

Wider use of the school plant, by CLARENCE ARTHUR PERRY. New York, Charities Publication Committee, 1910. 423 p.

These pages contain the results of an inquiry into the use of the school after school hours, the information being gathered from the reports both of school authorities and voluntary organizations as well as by personal investigations. The various after school and evening activities are rapidly increasing. The school belongs to the people and it should be open to all their legitimate social activities, even though this large use requires an increase of the staff. The writer sums up his observations under evening classes, vacation schools, playgrounds, public lectures and entertainments, evening recreation centres, social centres, games and dancing, meetings in the school-houses, social betterment, lecture courses, etc. The illustrations show what is now being done at various places and are of great interest. This movement is obviously so wholesome that about the first question that arises in the minds of those who peruse it is "Why in the world did we not think of doing these things before this year of our Lord 1911?"

Norwich; a social study, by C. B. HAWKINS, with an introduction by the Dean of Norwich. London, Philip Lee Warner, 1910. 326 p.

This is a study of a boot trade English town such as ought to be made of every industrial community. The writer considers the provisions for the sick, charities, boy labor, the unemployed, rating and poor law authority, local government and public service, glancing at the other industries of the town such as food and drink, conveyance, engineering and metals, printing and lithography, cabinet making, silk, hair and brush making, laundries and charwomen, etc. The work is illustrated by many cuts, diagrams and tables which make an interesting and suggestive basis for work looking towards practical reforms.

The Journal of Race Development. January, 1911. Vol. 1, No. 3. Clark University, Worcester, Mass.

This third number contains articles by experts on "The Dynamic Factors in the Liberian Situation," "Is Liberia Worth Saving?" "The Probable Influence of the Turkish Revolution on the Faith of Islam," "Personal Experience in Turkish Massacres," "American Education in the Turkish Empire," "Autonomous Government for Porto Rico," "The Indian National Congress," "The Development of Racial Character," with a section of notes and reviews. The editor, Professor Blakeslee, of Clark University, has spared no pains to gather the best testimonies on the subjects treated and here prints some of the addresses at his conference held at Clark University last summer.

The Jews: a study of race and environment, by MAURICE FISHBERG. London, Walter Scott Publishing Co., Ltd., 1911. 578 p.

This is a compend with a few score illustrations and plenty of references and treats of the Jews from a historical, ethnical, demographic, pathological and sociological point of view, with concluding chapters on occupations, criminality, physical conditions, social disabilities, and Zionism.

A voice from the Congo, comprising stories, anecdotes, and descriptive notes, by HERBERT WARD. N. Y., Scribner, 1910. 330 p.

This writer went to Africa not he says, from any high motive, but "simply and solely to gratify my love of adventure." He here prints his notes of travel, village scenes, an elephant hunt, the monkey people, Tippoo Tib, something about the slaver, animals, oddities, romance, etc.

A guide to reading in social ethics and allied subjects. Lists of books and articles selected and described for the use of general readers by teachers in Harvard University. Cambridge, Published by Harvard University, 1910. 125 p.

This is a bibliography of unusual interest in which perhaps a couple of dozen Harvard teachers have given the titles of works that have helped themselves most and which they believe would help others on such topics as social philosophy, institutions, service, the ethics of modern industry, social aspects of religion, and social ethics.

The marvels beyond science, by JOSEPH GRASSET. Funk & Wagnalls, N. Y., 1910. 87 p.

Part one is devoted to definitions, historical account and difficulties in making the survey. Part two describes the occultism of yesterday such as animal magnetism, hypnotism, the theory of the unconscious, polygonal memories, crystal gazing, unique associations of ideas. Part three is the occultism of to-day. In this he treats of psychological radiations, the astral body, etc.

The age of mammals in Europe, Asia and North America, by HENRY FAIRFIELD OSBORN. The Macmillan Co., N. Y., 1910. 635 p.

This work is written in the spirit of Huxley, to whom it is dedicated, and the author emulates his gift of speaking to the learned and the unlearned at the same time. The author's investigations extend over many years and over a wide range of both territory and of topics, and he has here gathered together the general results of his studies under the main heads of introduction, the Eocene, the Oligocene, the Miocene, the Pliocene, the Pleistocene, each with various subsections and chapters. In their present form, these are the Harris Lectures given at the Northwestern University. The book is well equipped with references, illustrations and a good index and is a very valuable contribution to its subject.

Fairy tales of all nations. Famous stories from the English, German, French, Italian, Arabic, Russian, Swedish, Danish, Norwegian, Bohemian, Japanese, and other sources. Translated and edited by Logan Marshall. Philadelphia, John C. Winston Co., 1910. 314 p.

We have here between two and three dozen of the most noted fairy tales gathered from the folk lore of more than half as many different places, each with one or more illustrations. The stories are well told and the illustrations, which are colored, are well selected.

Industrial studies. United States. By NELLIE B. ALLEN. Boston, Ginn, 1910. 335 p.

The chief topics are surface drainage, climate, soil, waterways, railroads, cotton, sugar, fruit, wheat, corn, coal, iron, gold, silver, beef, sheep, wool, lumber and fishing. The work is copiously illustrated.

Elementary chemistry, by HOLLIS GODFREY. New York, Longmans, Green, 1909. 456 p.

The ideas that have governed the author of this book are simplicity and arousalment of realization that the science of daily life is identical with that of the classroom and to include the essential facts assimilated in one year's work. Stress has been given on the proper sequence so that a pupil may have a clear uninterrupted progression of thought from the beginning to the end of each chapter.

Elements of business arithmetic, by ANSON H. BIGELOW and W. A. ARNOLD. New York, Macmillan, 1911. 258 p.

This arithmetic was undertaken in the belief that in this topic should be taught the methods most in vogue in the business world and in such a way as to form correct habits by those who are to attack the problems of real life. Thus business methods had first to be investigated and then the whole subject written up from the viewpoint of habit forming after the methods had received the sanction of industrial leaders. The processes here are strictly arithmetical without the abstractions of algebra and geometry, which immature young people do not comprehend. It is on the whole a stirring and very stimulating new departure.

What's wrong with the world, by GILBERT K. CHESTERTON. Dodd, Mead & Co., N. Y., 1910. 367 p.

The trouble with the world is that very many men are homeless literally and metaphorically. True domesticity means rest for the very soul. The next trouble with the world is imperialism. Then follow feminism, education or mistakes about the child.

Woman and the republic, by HELEN KENDRICK JOHNSON. Pub. by the National League for the Civic Education of Women. N. Y., 1909. 359 p.

This is a survey of the woman suffrage movement in the United States and a discussion of the claims and arguments of its foremost advocates. The author's conclusion is that "the movement to obtain the elective franchise for woman is not in harmony with those through whom woman and government have made progress." "The suffrage movement strikes a blow squarely at the home and the marriage relation." The general conclusion of the work is "that woman's relation to the republic is as important as man's."

Tales come true and tales made new, by MARGARET COULSON WALKER. N. Y., Baker and Taylor Co., 1910. 148 p.

This author encourages children to make things out of apples, potatoes, flowers, pumpkins, turnips, radishes, etc., and in this way by very clever utilization of common articles of furniture, many animals and quaint human

characters are represented, fifty-three in all, so that the book is on the whole a rather clever bit of ingenuity on the part of an adult although children alone would never think of doing such things.

Old age deferred. The causes of old age and its postponement by hygienic and therapeutic measures. By ARNOLD LORAND. Second edition. Trans., with additions, by the author from the third German edition. Phila., F. A. Davis Co., 1911. 472 p.

Although old age is a chronic illness, its symptoms can to a great extent be alleviated and thus permit the complicated human machinery to wear out smoothly. The work describes in simple language how overstrain of the various organs can be avoided. The writer describes the agencies that govern the condition of the nerves, the sexual system, how probable duration of life can be determined, the causes of old age, its premature construction and elimination of toxic products, the hygiene of the thyroid gland, liver, intestines, kidneys, skin, rational clothing, cold feet, sunlight and open air, artificial hearing, etc.

Classic myths in English literature and in art, based originally on Bulfinch's "Age of Fable" (1855), accompanied by an interpretative and illustrative commentary, by CHARLES MILLS GAYLEY. New edition revised and enlarged. Boston, Ginn. (1911.) 597 p.

This is a new edition of proven excellence in 32 chapters on Greek myths, myths of creation, gods of heaven, earth, the under world, waters, Roman divinities, the greater and lesser deities, Aeolis, Minos, Cecrops, Daedalus, the Trojan war, Ulysses, Eneas, Norse gods, Niebelung; with a second part dealing with the history of myth, its origin, distribution, preservation. The book is illustrated by nearly 200 well chosen cuts.

The labour exchange in relation to boy and girl labour, by FREDERICK KEELING. London, P. S. King & Son, 1910. 76 p.

This very valuable and interesting book treats of childrens labour exchanges, proposals and experiments in England and Scotland, Germany, experiments with conclusions and working out of the scheme and a bibliography.

What a father should tell his little boy, by ISABELLE THOMPSON SMART. N. Y., Bodmer Co. (1911.) 116 p.

What a father should tell his son, by ISABELLE THOMPSON SMART. N. Y., Bodmer Co. (1911.) 103 p.

What a mother should tell her little girl, by ISABELLE THOMPSON SMART. N. Y., Bodmer Co. (1911.) 105 p.

What a mother should tell her daughter, by ISABELLE THOMPSON SMART. N. Y., Bodmer Co. (1911.) 113 p.

These volumes are attractive in form and have the merit of distinguishing between what little children and older ones need to know. They are, however, we think, too sentimental and also too diffuse. Still they tell the facts. This, however, we think is much better done for girls than for boys.

Public schools for girls. A series of papers on their history, aims and schemes of study, by members of the Association of Head Mistresses. Edited by Sara A. Burstall and M. A. Douglas. London, Longmans, Green & Co., 1911. 302 p.

This book is made up of 24 chapters by as many different authors on rise and development of public secondary schools for girls, junior school work, divinity, English, geography, history, modern languages, classics, mathematics, natural science, home arts and sciences, drawing, music; language work, gardening, physical training, hygiene and comfort, medical inspection, resident schools and boarding schools, examinations, etc.

The training of teachers for secondary schools in Germany and the United States, by JOHN FRANKLIN BROWN. N. Y., MacMillan, 1911. 335 p.

The writer first describes the training of German teachers, their classification, institutions, the seminary, opinion and practice, standing and impressions. The second part, beginning with page 207, is devoted to training of American teachers, classification, institutions, responsibility, standard, plan for providing the desired training.

The adolescent, by J. W. SLAUGHTER; with an introduction by J. J. Findlay. London, Swan Sonnenschein & Co., 1911. 100 p.

The author here has attempted to epitomize in brief form and in lucid language the practical result of Dr. G. S. Hall's work on Adolescence to which the author says he hopes his book will serve as an introduction and lead to its careful and extended study. Its ten chapters are: a general survey, growth and physiological changes, normal development of instincts and emotions, adolescent love, scepticism and storm and stress, unification or the philosophical psychosis, pathology and hygiene, juvenile crime and its treatment, education of boys and of girls during adolescence.

Vocational education, by JOHN M. GILLETTE. N. Y., American Book Co. (1910). 303 p.

This interesting and timely book is divided into three parts. Part I treats the educational renaissance, the vocational movement and interests, accomplished results, reactions on education in the school; Part II, the social demands of education, society and the individual, democracy and its imperatives, the importance of the economic interest in society and its significance for education, philosophical demands, social end, state education; Part III treats of the methods of socialization, its criterion and its place in the programme of studies and also of subjects and the last chapter contains some specialized programmes.

The teaching of agriculture in the high school, by GARLAND ARMOR BRICKER. N. Y., Macmillan, 1911. 202 p.

This is a valuable, timely and greatly needed book. The schools garden movement has spread over the country, but in general, the interest here excited stops at the high school. There are, however, various schools where this is not the case and it is these this author describes in the second chapter. The author thinks that secondary agriculture should be taught as a separate science. He gives physiological and psychological determinants of sequence, organization of the course, method of presentation organization of laboratory and field work, an illustrative list of classified exercises also education aims, values and ideas. The book has a few well chosen sample exercises.

The American newspaper, by JAMES EDWARDS ROGERS. Chicago, University of Chicago Press 1909. 213 p.

This deals with the historical evolution of the modern newspaper, its relation to the city, its nature, its influence, and the cause for the psychological and economic interpretation.

Medicine and the church, being a series of studies on the relationship between the practice of medicine and the church's ministry to the sick, by SIR CLIFFORD ALBUTT, A. W. ROBINSON and others. Edited with an introduction by Geoffrey Rhodes. With a foreword by the Lord Bishop of Winchester. London, Kegan Paul, Trench, Trübner & Co., 1910. 298 p.

Here we have an interesting book by twelve writers of eminence introduced by a Lord Bishop. The topics and viewpoint are naturally different. The topics treated by the various authors are the metaphysics

of Christian Science, prayer and mental healing, the Eucharist and bodily well-being, the church and mental healing, our Lord's attitude toward sickness, faith and mental instability, the relation of priest and doctor to the patient, medicine and religion.

Report to the Board of Estimate and Appointment of the City of New York by the Commission on Teachers' Salaries. October 17, 1910. 143 p.

This stirring pamphlet is the result of a careful survey which shows present conditions and makes recommendations concerning such topics as undesirable multiplicity of salary schedules, salary increase, cost of living, its relation to efficiency, the bonus system, interrelations of sex, work and pay, need of men teachers, equal pay for equal work principle.

A little fifer's war diary, by C. W. BARDEEN. Syracuse, N. Y., 1910. 329 p.

This contains 17 maps, 60 portraits, and 246 other illustrations. It is an extremely concrete and interesting narrative of a member of Company D in the first Massachusetts infantry. It is pervaded by quick wit and keen humor and the author has a quick sense of shams and pretense. It might be considered a peace document, for interesting as it is it brings out in a startling way the horrors of war.

The personal equation, by LAWRENCE McTURNAN, with an introduction by James L. Hughes. N. Y., Moffat, Yard & Co., 1910. 248 p.

This work is not scientific, nor is the personal equation that which astronomers know. The writer treats of the great lives of great teachers, workaday heroes, biography of youth and age, great women, the human side of heroes, controversies of adversity, books as teachers.

Artistic homes, by MABEL TUKE PRIESTMAN. Chicago, A. C. McClurg & Co., 1910. 148 p.

The contents embrace chapters upon a colonial home in Germantown, a barn that found itself, a house cleverly planned with built-in furniture, and describes other unique homes by the sea and in the mountains, suburbs, country, in English style, the old farmhouse, the house made over from a stable, a relic of the past, suggestions from a Jersey bungalow, commonplace city houses made attractive. The book is copiously illustrated.

Observations d'un musicien Américain, par LOUIS LOMBARD. Tr. par Raoul de Lagenardière. Paris, Louis Theuveny, 1905. 198 p.

This book contains aphorisms on a great number of topics, music and dance of different people in Europe, the timbre of the voice, many composers, use and abuse of the piano, the commercial value of violins, lyric theatre, conservatories, etc.

A rapid survey of the Massachusetts Educational System, by CHARLES A. HARRIS. Copyright, 1910, by Charles A. Harris. (Publisher not given). 100 p.

This little historical sketch is excellently prepared and should be a convenient manual for its purpose. We can but wish, however, the author paid a little more attention to bibliography.

Plutarch on education. Embracing the three treatises: The education of boys; How a young man should hear lectures on poetry; The right way to hear. By CHARLES WILLIAM SUPER. Syracuse, N. Y., Bardeen, 1910. 192 p.

Macaulay's essays on Clive and Hastings. Edited with introduction and notes by Charles Robert Gaston. Boston, Ginn, 1910. 268 p.

Rosalynde, or Euphues golden legacy, by THOMAS LODGE. Edited with introduction and notes by Edward Chauncey Baldwin. Boston, Ginn, 1910. 131 p.

Lowell's The vision of Sir Launfal, and selected poems. Edited with notes and introduction by Allan Abbott. N. Y., Longmans, Green, 1910. 78 p.

Thomas Gray's Elegy written in a country churchyard and other poems. Oliver Goldsmith's The deserted village, The traveller, and other poems. Edited with notes and introduction by James F. Hosic. N. Y., Longmans, Green, 1910. 80 p.

Huxley's Autobiography and selected essays from Lay Sermons, edited with notes and introduction by E. H. Kemper McComb. New York, Longmans, Green, 1910. 186 p.

Fourth Biennial report of the State Board of Charities and Corrections of the State of California, from July 1, 1908, to June 30, 1910. Sacramento, W. W. Shannon, 1910. 202 p.

Massachusetts Historical Society. Proceedings, October, 1909-June, 1910. Vol. 43. Boston, Published by the society. 1910. 724 p.

Les methodes de la raison, précédées d'un exposé complet du travail cérébral, par P. FROUMENT. Paris, Vigor Frères, 1908. 106 p.

New-world speller. Grades one and two. By JULIA HELEN WOLFARTH and LILLIAN EMILY ROGERS. Yonkers-on-Hudson, New York, World Book Co., 1910. 94 p.

Schulpsychologie Unterrichts-und Erziehungslehre, von SCHULRAT RZESNIKEK. Durrschen Buchhandlung, Leipzig, 1910. 254 p.

From passion to peace, or The pathway of the pure, by JAMES ALLEN. New York, Crowell, 1910. 53 p.

Kurzsichtigkeit und Schule, von HUBERT H. WINGERATH. Leopold Voss, Leipzig, 1910. 127 p.

Universities and national life, by THE RIGHT HON. R. B. HALDANE. London, John Murray, 1910. 110 p.

These three lectures are entitled: the soul of the people, the calling of the preacher, and the dedicated life.

Two Russian reformers, by J. S. T. LLOYD. London, Stanley Paul & Co., 1910. 335 p.

These two reformers are Ivan Turgenev to whom the first 200 pages are devoted and Leo Tolstoy who claims the rest.

Church work with boys, by WILLIAM BYRON FORBUSH. Boston, The Pilgrim Press. (1910.) 105 p.

State commission in lunacy. Twenty-first annual report. State of New York. No. 35. 1910. 440 p.

NOTES.

(From The Eugenics Review, Feb., 1911, Vol. 2, pp. 319-321.)

We are indebted to Monsieur Michel Huber, Statistician to the *Statistique Générale* of France, and a member of the French Ministry of Labour, for the following laws and regulations relating to maternity assistance, which have been enacted in France.

Law of November 27th, 1909, Guaranteeing to women in child-bed their work or employment.

The only clause: Absence from work on the part of a woman for eight weeks consecutively before and after child-birth does not allow her em-

ployer to break his contract with her for her services except under a penalty of damages with interest payable to the woman.

The woman must give her employer due notice of the cause of her absence. Any private agreement to the contrary is void in law.

The woman may claim legal assistance in case of need in a law court of the first degree.

Law of March 15th, 1910, Granting absence from duty with allowances to school teachers in child-bed.

Clause 1. Absence for two months with full salary, independent of leave of absence for illness as set forth in the decree of November 9th, 1853, is to be allowed to school mistresses, half before and half after the birth of a child.

No schoolmistress may return to work till after a medical examination and a certificate that she may do so without injury to her health; otherwise extended leave of absence is to be granted her on the same terms as before, till two months have elapsed.

State aid to Associations for Maternity Assistance. Budget of 1910. Ministry of the Interior.

Cap. 37. Grants to associations for maternity assistance and the protection of young infants, 500,000 frs. = £20,000.

This grant is to provide State aid, in proportion to their efforts and to the results shown, to such associations for maternity assistance as afford pecuniary help to enable women to rest before and after child-birth.

Ministry of Labour. Statistique Générale de la France.

Every workman receives at marriage a gift of 100 francs.

Married workmen receive a gift of 100 francs each at the birth of a child. The mother, if she is in work or in service, has a right to six weeks' holiday on full pay.

Every workman who has more than three children on his hands under the age of 16 receives the sum of 100 francs per annum for each child after the third.

Circular Issued by the Minister of War, April 20th, 910. Prizes for women who suckle their children and who work in the shops of the War department.

Workwomen suckling their own children will be paid at the end of each four months after the date of birth a premium of 10 francs.

In the case of twins the premium will be raised to 10 francs per month for each child, if both are suckled by the mother.

Grants to families. Given since January 1st, 1910.

The City of Paris gives to all workmen and others employed by the municipality who are the fathers of at least four children under the age of 13, 50 francs per annum in respect of each living child after the fourth who is under that age, provided that such fathers' yearly salaries do not amount to 400 francs (£16) inclusive of bonuses and extra pay, and that they are the sole support of their families respectively.

The Department of the Seine gives 50 francs per annum to all workmen who have at least four children on their hands.

The Municipal Council of Paris.—It was proposed by M. A. Rendu, with regard to reorganizing the relief of the poor (*l'assistance publique*) to increase to the widest extent relief to women, mothers, young children, widows with children on their hands, young workwomen and adults threatened with tuberculosis.

The Credit Lyonnais. Boulevard des Italiens, Paris.

Every woman in the employment of this concern has, in the event of child-birth, leave of absence for thirty days with full pay.

Grants for family expenses made to the workmen and widows employed in proportion to their salaries: 10 francs per month for the second child and 15 francs for the third and others following, or 10 francs per month for

the third and 15 francs for the fourth and others following. The grant is withdrawn for boys at the age of 15 and for the girls at the age of 16.

The Association of the Friends of the *Crédit Lyonnais* grants the following assistance to mothers whose husbands do not draw a salary above a certain sum.

Women in child-bed receive during four weeks a sum equal to the grant made by the *Mutualité Maternelle*, of Paris.

A premium is given to the mothers who suckle their infants.

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Six weeks absence on full pay is given the mother in child-bed.

In various localities people are at last waking up to the danger of the dry atmosphere of the ordinary schoolroom and in many schools experiments at least with various plans for humidifying the air are being made. From the Pierce public school in Brookline, for example, it is reported that the air has been humidified to some extent by a perforated pipe led from the main pipe to the air chamber and the relative humidity in consequence is 45% to 50% while at a neighboring school it is about 35%, and it is reported that now with a temperature of some 62° to 64° neither scholars nor teachers complain.

From a private school in Newton Miss Evelyn Ellis reports an interesting fresh air experiment for nine weeks in two classrooms. The rooms have been kept at about 60° Fahrenheit. The following definite results are reported; in case of some children a general improvement in health, in others decrease of nervousness, and an improvement in the concentration of the pupils, this being specially noticeable in some cases; but the plan adopted did not in this instance protect the children from the usual colds. The teachers are unanimous in approving 60° as the optimum temperature for studying and teaching, and the children are said to show no fatigue and to be as fresh at the close of school as at the opening, even at the last period on Friday.

The detailed report of the temperature indoors and out during the experiment is as follows:

"Average for Oct. in front room	64°;	for Nov.	61°;	Dec. (one Week)	61°.
" " " " new "	61°;	" " "	60°;	" " "	61°.
" " " outdoors	56°;	" " "	42°;	" " "	21°.

This has meant the south windows more or less open, practically all the time, except at the beginning of school on a few of the coldest mornings."

Superintendent Martindale, of Detroit, reports that in that city during the months of September and October there were 6,236 open air classes, and he suggests that it would be well if the Board of Education could arrange for out-door classes for the greater part of the school children from May to July and from September to November.

A well-known writer in German educational periodicals, Hermann Scherk, has proposed a formal petition addressed to the Prussian *Kultusminister* asking that a special week be set apart in which parents may be allowed to visit the regular classes of the school attended by their children. Under existing regulations no visitors are allowed at any time except by a special permit which entails considerable formality and delay. The advantage of a nearer relation of parents to the school is urged and it is suggested that the enhanced interest of parents, who are the taxpayers, might also redound to the advantage of the teacher as well as the child. In view of the circumstances the petition seems extremely moderate and its success to be desired.